FIDELITY

ZX-3000

also cover ZX-3000 II

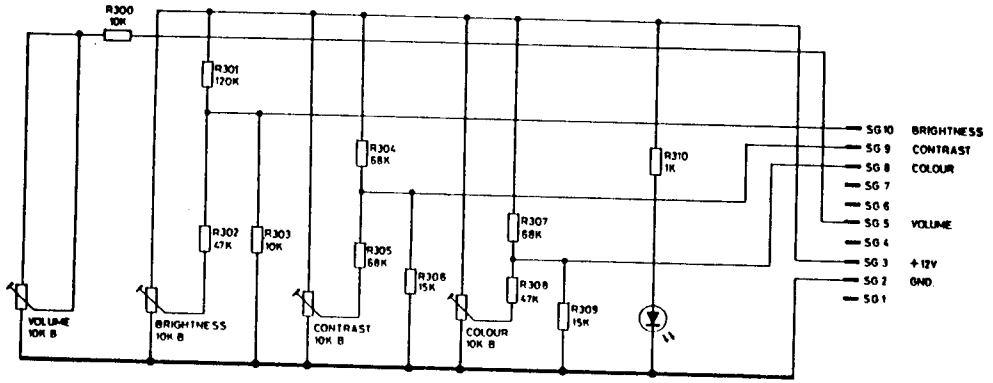
CTV-20T
CTV-22
CTV-22R
CTV-22T
CTV-2001/R

+

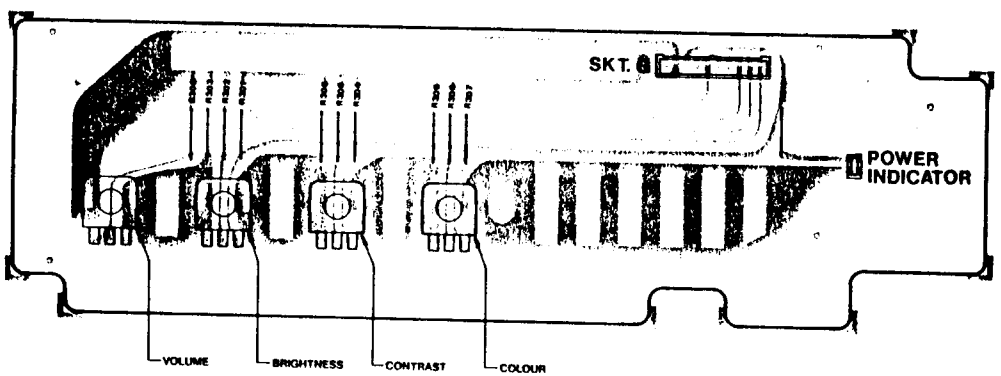
CTV-2022
CTV-2024
CTV-2210
CTV-2224

BUSH
1500/A

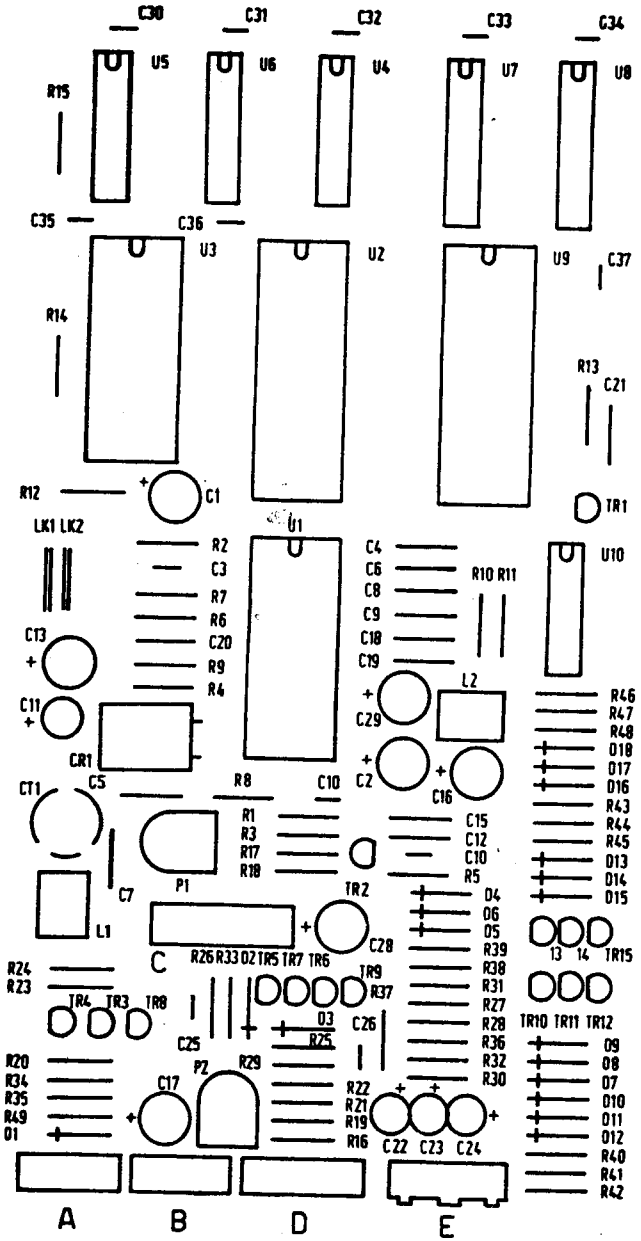
CM-14
CTM-1400
CTV-14S
CTV-20
CTV-20R



CONTROL P.C. BOARD CIRCUIT DIAGRAM

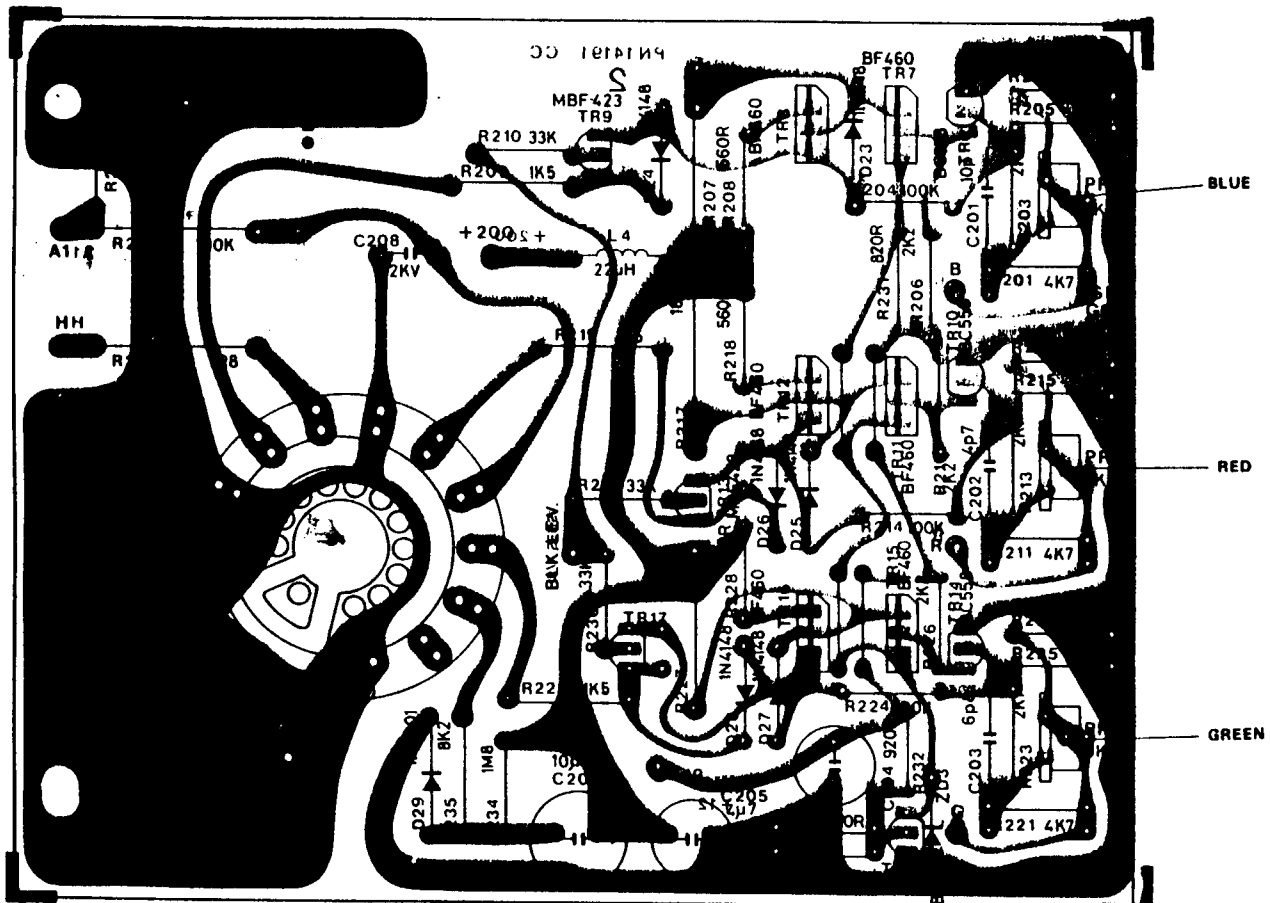


CONTROL P.C. BOARD COMPONENT LAYOUT



P/NO. 14213/6

TELETEXT DECODER P.C.B. COMPONENT LAYOUT



VIDEO AMP P.C.B. COMPONENT LAYOUT

RESISTORS (R)

REF	VALUE	REF	VALUE
1	3K3	74	100R
2	470R	75	10K
3	10R	76	100K
4	47K	77	3K9
5	2M2	78	8K2
6	470R	80	2R2 6W
7	10R	81	330K
8	39K	82	10K 2W
9	330R	83	10K 2W
10	47K	84	R68
11	47K	85	100K
12	4K7	86	220R
13	270R	87	1K2
14	680R	88	8K2
15	10R	89	10K
16	820R	90	22R
17	330R	92	100R 3W
18	2K2	93 20"TV	15K 2W
19	1K	93 22"TV	18K 2W
20	4R7	94	220R
21	22K	95 20"TV	470R 2W
22	470R	95 22"TV	1K 2W
23	10R	96	2K2 1W
24	1R	97	4R7 4W
28	1M	98	100K
32	100K	99	100K
33	1K5	100	22K
34	4K7	101 20"TV	1R5 2W
35	39K	101 22"TV	1R 2W
36	470K	102	22R
37	56K	103	220R 1W6
38	100K	104	120K
39	5K6	105	5K6
40	1K2		
41	1K2		
42	1K		
43	470R		
44	470R		
45	470R		
49 20"TV	18K		
49 22"TV	27K		
50	5K6		
51 20"TV	8K2		
51 22"TV	5K6		
52	22K		
53	1R		
54 20"TV	2R2		
54 22"TV	R68		
55 20"TV	330R		
55 22"TV	270R		
56	470R		
58	470R		
59	2K2		
60	390R		
61	1K5		
63	470R		
64	1K		
65	1K		
66	1K		
67	33K		
68	1K		
69	33K		
70	130K		
71	100K		
72	100R		
73	100R		

DIODES (D)

REF	TYPE
3	BY127
4	BY127
5	BY127
6	BY127
7	IN4007
8	RGP15J
9	IN4002
10	RGP15J
11	RGP15J
13	RGP15J
14	IN4148
15	BA157
16	BY228
17	RGP15J
18	RGP15J
19	RGP15J

TRANSISTORS (TR)

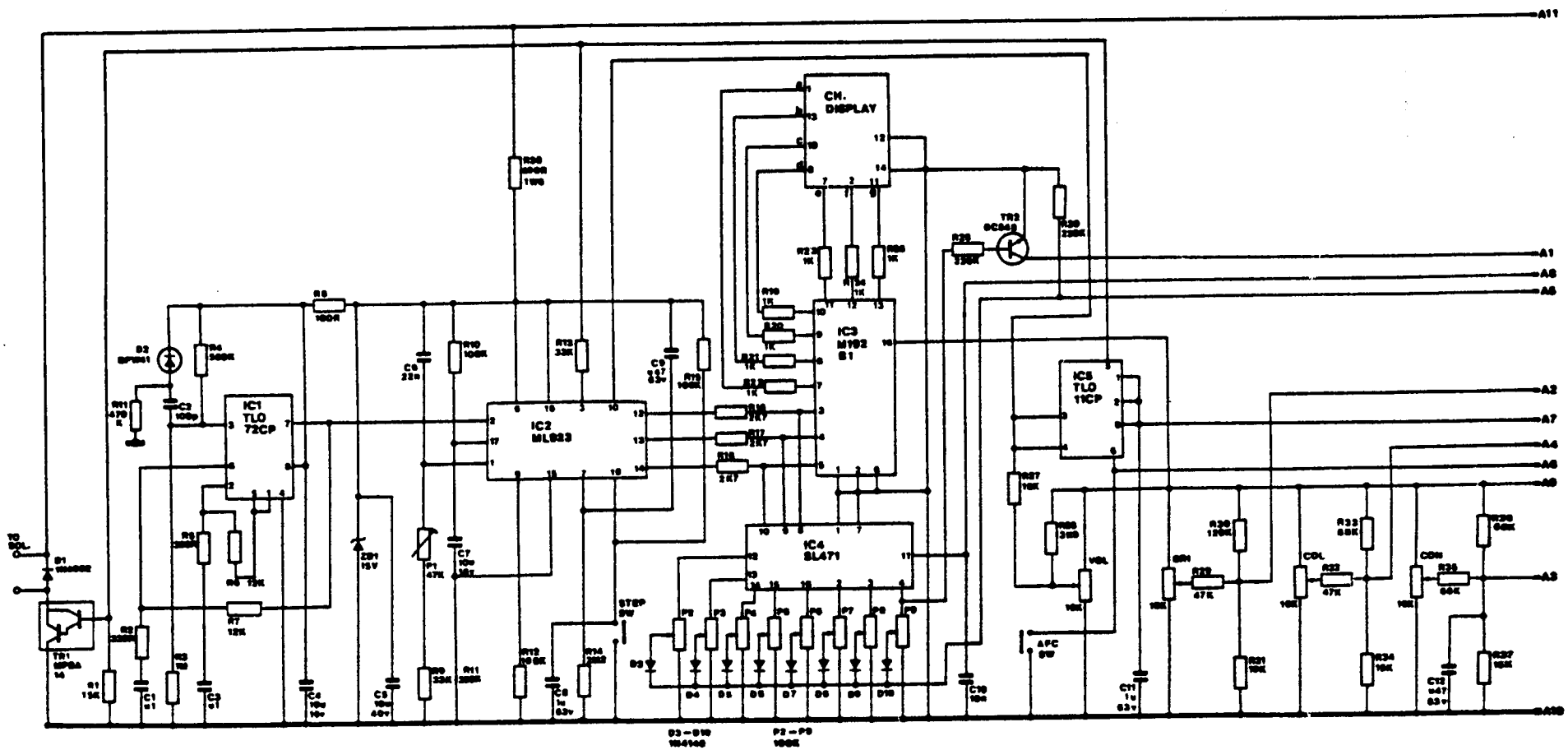
REF	TYPE
1	BC549
2	BC549
3	BU426A
4	BF460
5	BU508

CAPACITORS (C)

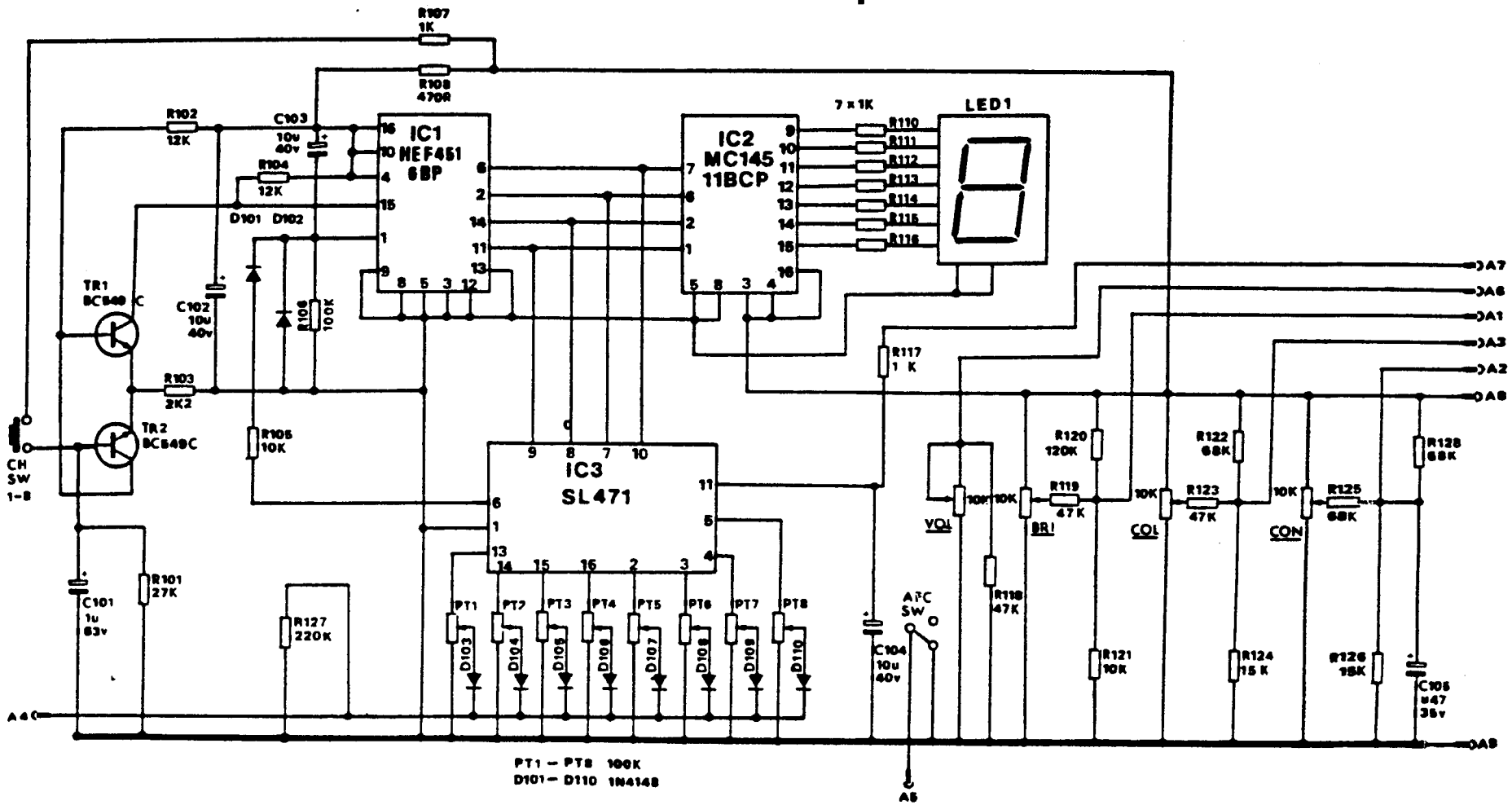
REF	VALUE	REF	VALUE
1	100µ 16V	76	1µ 63V
2	100µ 10V	78	1µ 63V
3	22p	77	1µ 63V
4	47p	81	µ1 250V
5	2n2	82	2n2
6	10n	83	2n2
7	2µ2 63V	84	2n2
8	10n	85	2n2
9	10n	86	220u 385V
10	100n	87	100µ 25V
11	10n	88	100p
12	47µ 25V	89	100µ 25V
13	4µ7 63V	90	4n7
14	22n	91	1µ 63V
15	1n5	92	8n2
16	10p	93	100µ 25V
17	1n5	94	2n2 2KV
18	4n7	95	220p 500V
19	100n	98	470µ 50V
20	100n	99	220p 500V
21	33µ 10V	100	33µ 250V
22	10p	101	100n
23	1µ 63V	102	2n2
24	4n7	103	27p
25	47µ 25V	104	1µ 250V
26	470µ 50V	105	10n
27	470µ 16V	106	10n 1500V
28	220u	107	470n 250V
32	µ47 63V	109	220p 500V
33	220n	110	220p 500V
34	1µ 63V	111	100µ 50V
35	1n2	113	2200µ 40V
36	1n	114	4µ7 350V
37	130p	115	100n
38	100p	116	100n
39	220n	117	10n
40	220n	118	22u 25V
41	68n	119	4µ7 63V
42	4µ7 63V	120	100n
43	1u 63V	121	820p
44	220n		
45	100µ 10V		
46	220n		
47	150n		
48	470p		
54	22p		
56 20"TV	100µ 25V		
56 22"TV	220µ 25V		
57	10µ 16V		
58	220n		
59 20"TV	1000µ25V		
59 22"TV	2200µ25V		
60	100n		
61	100µ 25V		
62	10n		
63	100p		
64	330n		
65	1µ 63V		
67	470n		
68	470n		
69	470n		
70	100n		
71	2µ2 63V		
72	100n		
73	10µ 16V		
74	27p		

CHOKES & COILS (L)

1	4µ7H
2	5784
3	6µ8H
4	5594
5	5598
6	5597
7	5598
8	22µH
9	5586
10	5586
11	5586
12	5587



MODELS:– CTV 20R/CTV 2024/CTV 22R/CTV 2224
CONTROL P.C. BOARD CIRCUIT DIAGRAM



PT1 – PT8 100K
D101 – D110 1N4148

MODELS:– CTV 20/CTV 2022/CTV 22
CONTROL P.C. BOARD CIRCUIT DIAGRAM

ZX3000 CHASSIS

ALL THE TABLES BELOW ARE FOR 14" & 20" NON TELETEXT SETS USING THE S.G.S. MAIN BOARD USING TDA 3190 AUDIO IC (P.C.B. N° 14195 & ASSY. N°.01195)
ALL VOLTAGES MEASURED USING AN AVO '8' ANALOGUE MULTIMETER

SUPPLY VOLTAGE 113v AT JUNCTION OF R95 & R97
MAIN BOARD I.C. VOLTAGES

PIN N°	IC1 TDA 3541	IC2 SL1432	IC3 TDA 3190	IC4 TDA 8180	IC5 TDA 2270	IC6 TDA 3562	IC7 TDA4600
1	4v3	8v6	3v0	0v8	23v5	11v8	4v2
2	4v3	11v2	3v1	1v7	1v5	3v8	0v15
3	1v2	5v6	3v1	2v0	-	4v9	2v1
4	8v6	5v6	-	4v1	-	2v6	2v1
5	6v7	2v8	-	3v0	-	2v6	6v9
6	2v1	-	2v5	2v8	-	2v8	-
7	3v5	1v3	2v5	2v1	14v5	1v5	1v6
8	7v2	0v4	5v2	-	24v0	1v4	1v6
9	7v2		13v5	0v9	2v1	-	13v8
10	3v5		0v7	3v2	-	2v3	
11	11v5		13v1	-	-	1v5	
12	3v8		-	1v1	-	1v1	
13	-		-	3v6	-	3v8	
14	6v6		26v5	4v7	-	1v0	
15	4v3		13v5	1v5	2v1	4v0	
16	4v3		13v5	4v7	2v1	1v0	
17				0v7		4v0	
18				3v3		1v6	
19				-		3v2	
20				1v0		2v3	
21				-		2v3	
22				4v9		2v3	
23				-		2v3	
24				5v0		9v2	
25						8v7	
26						2v3	
27						-	
28						7v5	

MAIN BOARD TRANSISTOR VOLTAGE TABLE

	TR1 BC547C	TR2 BC548	TR3 BU508A	TR4 BF460	TR5 BU508A	
COLLECTOR	0v7	12v8	325v0	94v0	105v0	
BASE	-	3v8	-0v1	-1v5	-0v6	
EMITTER	-	3v2	-	-	-	

MAIN BOARD REGULATORS VOLTAGE TABLE

	L.7812C.V	SGS L78M05CX
INPUT	14v5	11v5
GROUND	-	-
OUTPUT	12v0	5v0

L.O.P.T. VOLTAGE TABLE

PIN N°S	VOLTAGES
1	N.C.
2	105v0
3	N.C.
4	0v
5	-0v1
6	-0v1
7	115v0
8	-
9	11v0
10	115v0

SWITCH MODE TRANSFORMER VOLTAGE TABLE

PIN N°S	VOLTAGES
1	9v5 A.C.
2	390vA.C.
3	150vA.C.
4	260vA.C.
5	31vA.C.
6	N.C.
7	0v
8	-
9	0v
10	-
11	0v
12	310vD.C.
13	N.C.
14	310vD.C.

SCAN COIL LEADS VOLTAGE TABLE

3 WAY MOLEX	
YELLOW	14v5
GREEN	14v5
4 WAY MOLEX	
RED	105v0
WHITE	105v0

TUBE BASE BOARD TRANSISTOR VOLTAGE TABLE

	TR6,10,14 BC558	TR7,11,15 BF460	TR8,12,16 BF460	TR9 BF423	TR17 BF423	TR18 BC558
COLLECTOR	-	115v0	170v0	7v1	8v8	-
BASE	3v3	4v0	115v0	118v0	115v0	2v7
EMITTER	4v0	3v4	117v0	115v0	117v0	3v4

C.R.T. VOLTAGE TABLE

PIN N°S	VOLTAGES
2	N.C.
3	0v
4	N.C.
5	0v4
6	105v0
7	290v
8	107v0
9	0v
10	4v9A.C.
11	105v0
12	0v

TUBE BASE LEADS VOLTAGE TABLE

5 WAY MOLEX	
BLACK	0v
MAUVE	1v6
BLUE	3v0
RED	3v6
GREEN	3v7
6 WAY MOLEX	
BROWN	0v
PINK	168v
GREY	0v
ORANGE	12v8

CONTROL BOARD IC VOLTAGE TABLE

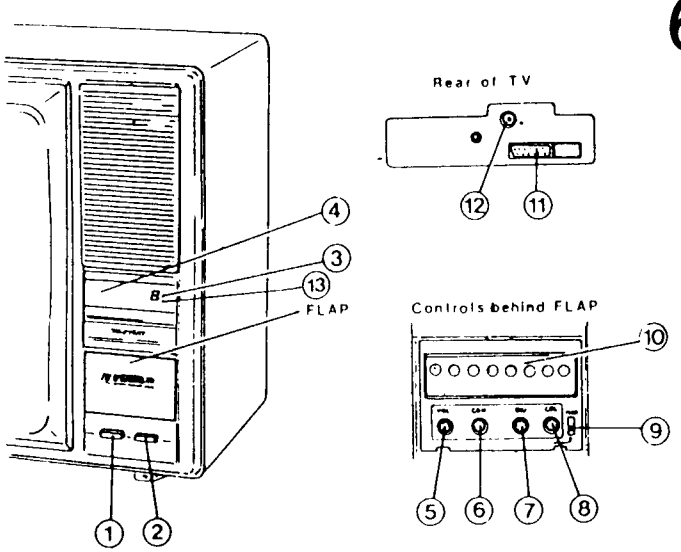
N°S	IC1 TL072CP	IC2 ML923	IC3 M192B1	IC4 SL471	IC5 TL011CP	
1	9v5	10v5	11v5	0v	5v2 O/P	
2	9v5	9v5	0v	•	5v2 N.C.	
3	3v4	-	•	•	1v2 I/P	
4	0v	14v5	•	•	1v2 N.C.	
5	9v5	14v5	•	N.C.	N.C.	
6	9v5	14v6	0v	N.C.	N.C.	
7	9v5	-	•	0v	0v	
8	14v5	N.C.	•	•	5v2 N.C.	
9		11v0	•	•		
10		1v2	•	•		
11		N.C.	•	35v0		
12		•	•	•		
13		•	•	•		
14		•	N.C.	•		
15			N.C.	•		
16		14v5	14v5	•		
17		12v5				
18		12v5				

CONTROL BOARD TRANSISTOR VOLTAGE TABLE

	TR1 MPSA14	TR2 BC548
COLLECTOR	24v5	4v1
BASE	-	-
EMITTER	0v	0v

CONTROL BOARD 10 WAY LEAD VOLTAGE TABLE

PIN N°S	VOLTAGES
A1	12v5
A2	1v5
A3	3v0
A4	2v7
A5	8v9
A6	2v3
A7	35v0
A8	12v8
A9	0v
A10	24v5



CONTROL IDENTIFICATION

1. Power On/Off Button
2. Channel Selector Button
3. LED Channel Display
4. Infrared Sensor
5. Volume Control
6. Contrast Control
7. Brilliance Control
8. Colour Control
9. Euroconnector Function Switch
10. Preset Tuning Controls
11. Euroconnector
12. Aerial Socket
13. Command Received LED

WARNINGS

1. For reasons of safety, all parts replaced should be identical to the original ones. (For parts and part nos. see parts list on pages 14 to 18 available from our Service Department.)

2. In order that damage to I.C's and transistors is prevented any flashover of the Extra High Voltage must be avoided. A proper meter should be used to check the E.H.T.

3. Do not attempt to replace components when the unit is in the switched on mode. Withdraw the mains plug from the socket before commencing any soldering on the unit.

4. Do not use metal tools for alignment. Use plastic tools.

5. Do not cover any ventilation on the back cover of the receiver.

6. The power supply at the input section is NOT isolated from the mains and therefore an isolating transformer should be used during the servicing of this section.

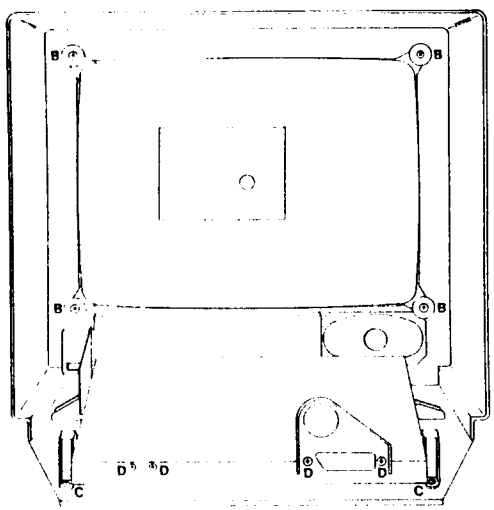
7. Components from the cathode of the bridge rectifiers up to and including the collector of TR 3 are at approximately 350V D.C. potential.

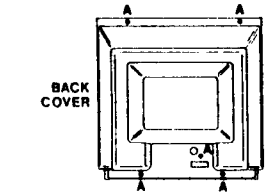
8. The E.H.T. must be fully discharged before disconnecting the high voltage anode cap from the C.R.T.

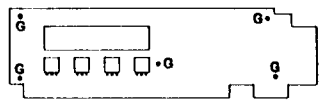
9. Do not disturb the deflection coils and/or adjustments on the C.R.T. as these have been set for optimum performance and sealed.

10. If damage has occurred to the main board due to mishandling of the receiver, i.e. if the track on C86 (220µF 385V vertical capacitor) is broken, C86 should be discharged via a suitable resistor prior to the removal of the board to avoid shock even when the receiver is not plugged into the mains supply.

NOTE: Please ensure after assembly of the unit that it is satisfactory from a performance aspect and is completely safe before returning it to the customer.







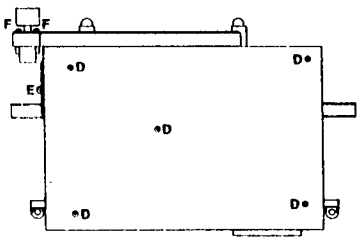


DIAGRAM 1.

FIG. 4

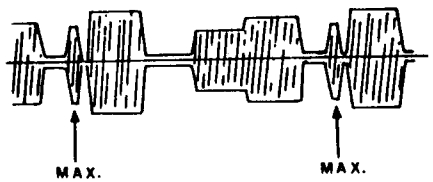


FIG. 5

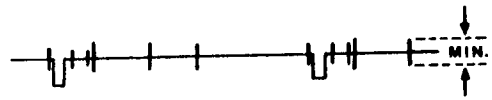
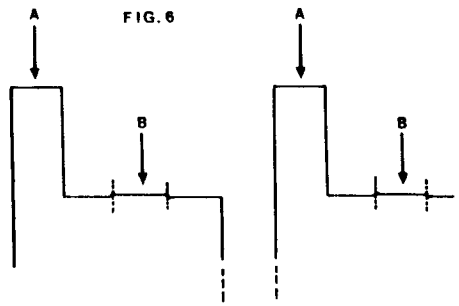


FIG. 6



ADJUSTMENTS

NOTE: Always use a high frequency insulated trimming tool to make the adjustments. These should be done very carefully.
Test Points are marked on the Main P.C.B. on the copper print side.

1) **SUPPLY VOLTAGE**
Turn brightness and contrast to minimum, connect a D.C. voltmeter between test point 32 and ground and adjust PR1 (10K) to read 114V D.C.
2) **HORIZONTAL & VERTICAL FREQUENCY**
For ZX3000 chassis with Sync. processor IC type TDA 8180 there is no adjustment required.

3) **PICTURE SIZE AND LINEARITY**
Feed in via the Euroconnector socket a video signal with cross hatch and circle. Then adjust for linearity the horizontal linearity coil, PR5(10K) for vertical height, PR4(100K) for vertical linearity, PR3(10K) for horizontal position and PR6(1K) for Vertical Shift.

ALIGNMENTS

For correct alignmentthe following equipment is necessary.
NOTE: All test points are numbered on the copper side of the Main P.C. Board.
a) T.V. Pattern Generator with video output.

b) Oscilloscope with calibrated time base.

1) **CHROMA BAND PASS COIL. L11.**
With the Pattern Generator modulated with a colourbar signal, monitor test point 22 with the oscilloscope. Adjust L11 for maximum burst amplitude as in Fig.4 on page 4.
2) **CHROMA TRAP COIL. L12.**
With the above signals monitor test point 20 and adjust L12 for minimum burst. See Fig.5 on page 4.
3) **DELAY LINE MATCHING COILS. L9 AND L10.**
With the generator modulating the "DEM" signal, monitor test point 49. Adjust L9 and L10 for equal amplitude of BARS 'A'. Adjust PR 8 to equal BARS 'B'. See Fig. 6 on page 4.

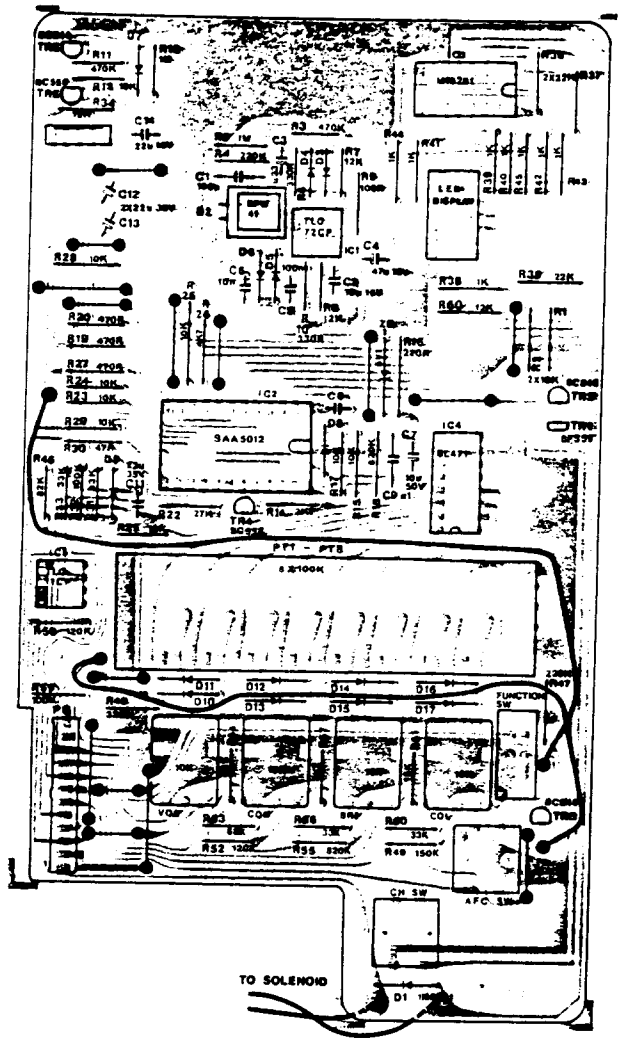
4) **GREYSCALE AND A1 SETTING.**
With the ZX3000 chassis the cut off is automatic. The screen control should be adjusted for 450V on pin 7 of the CRT using a 100M Ohm probe and Digital Voltmeter. The three presets PR9, PR10 and PR11 (Gain Controls) should be adjusted for white in the 'HIGHLIGHTS'.

5) **FOCUS**
Adjust the upper control on the F.B.T. (Flyback Transformer).

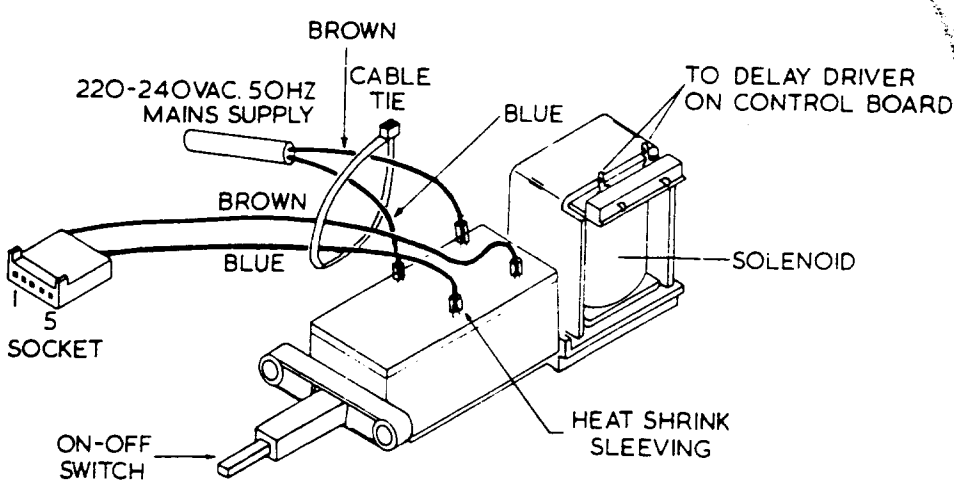
WARNINGS

1. For reasons of safety, all parts replaced should be identical to the original ones. (For parts and part nos. see parts list on pages 9 to 11 available from our Service Department.)
2. In order that damage to I.C's and transistors is prevented any flashover of the Extra High Voltage must be avoided. A proper meter should be used to check the E.H.T.
3. Do not attempt to replace components when the unit is in the switched on mode. Withdraw the mains plug from the socket before commencing any soldering on the unit.
4. Do not use metal tools for alignment. Use plastic tools.
5. Do not cover any ventilation on the back cover of the unit.
6. The power supply at the input section is NOT isolated from the mains and therefore an isolating transformer should be used during the servicing of this section.
7. Components from the cathode of the bridge rectifiers up to and including the collector of TR 3 are at approximately 350V D.C. potential.
8. The E.H.T. must be fully discharged before disconnecting the high voltage anode cap from the C.R.T.
9. Do not disturb the deflection coils and/or adjustments on the C.R.T. as these have been set for optimum performance and sealed.
10. If damage has occurred to the main board due to mishandling of the unit, i.e. if the track on C86 (220µF 385V vertical capacitor) is broken, C86 should be discharged via a suitable resistor prior to the removal of the board to avoid shock even when the unit is not plugged into the mains supply.

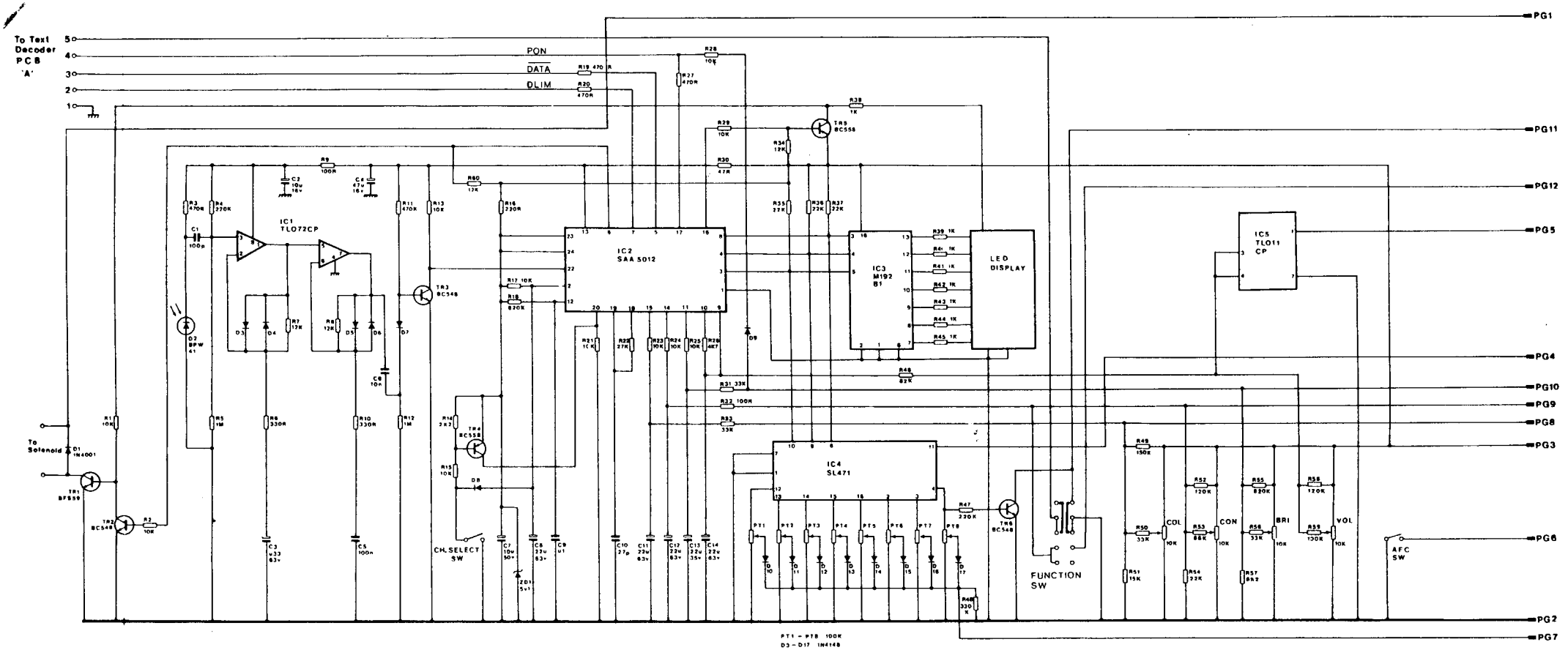
NOTE: Please ensure after assembly of the unit that it is satisfactory from a performance aspect and is completely safe before returning it to the customer.



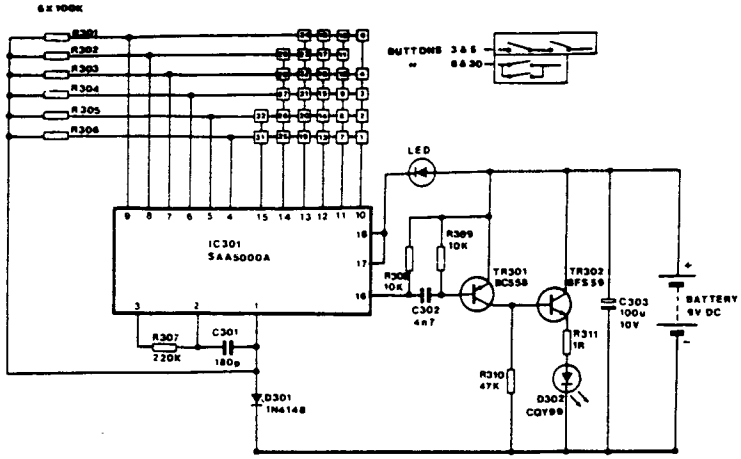
CONTROL P.C.B. COMPONENT LAYOUT



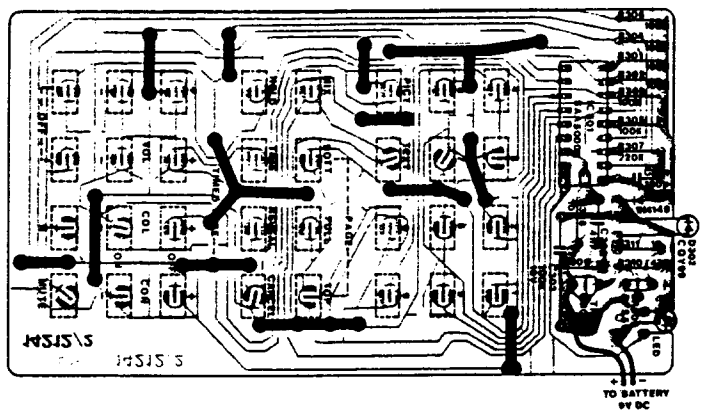
POWER MAINS SWITCH WIRING DIAGRAM



CONTROL P.C. BOARD CIRCUIT DIAGRAM



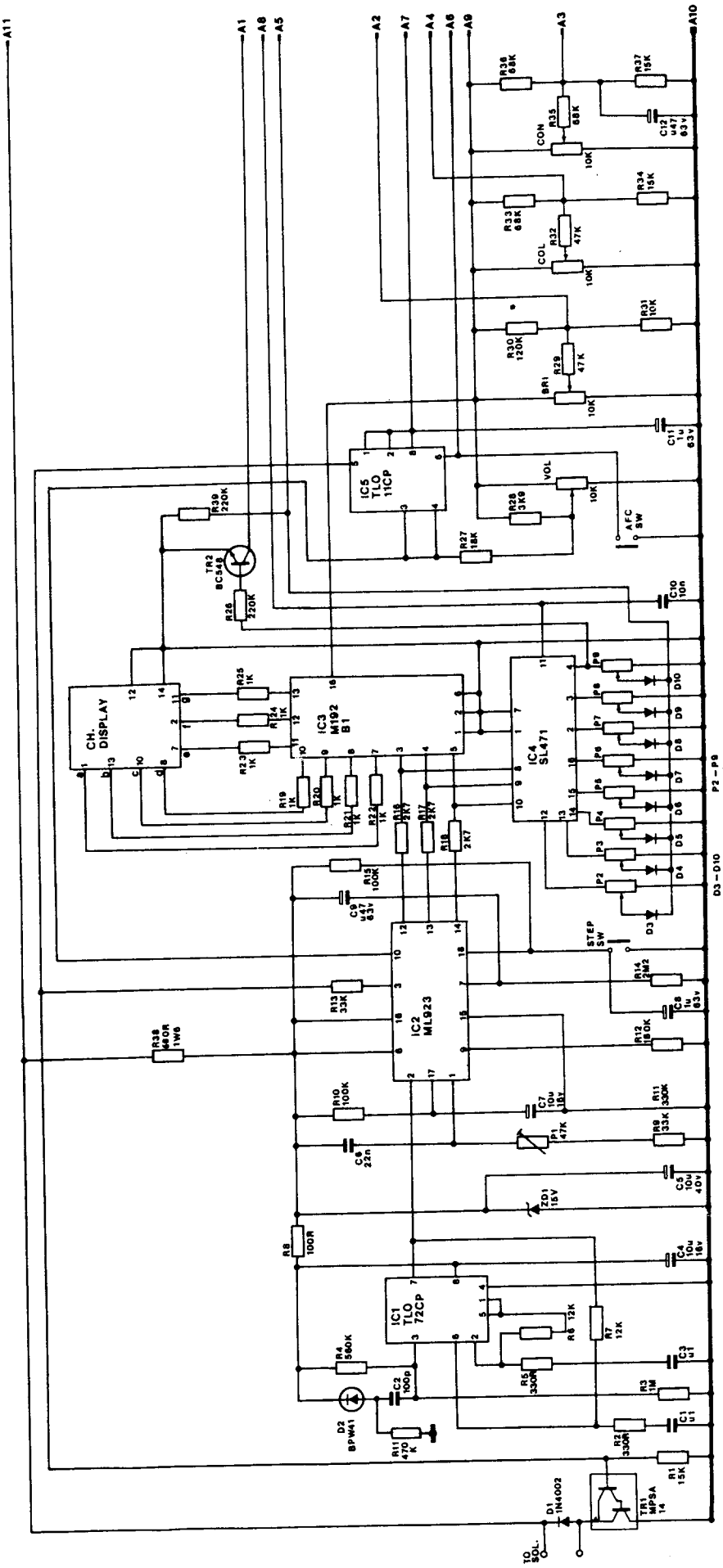
TRANSMITTER CIRCUIT DIAGRAM



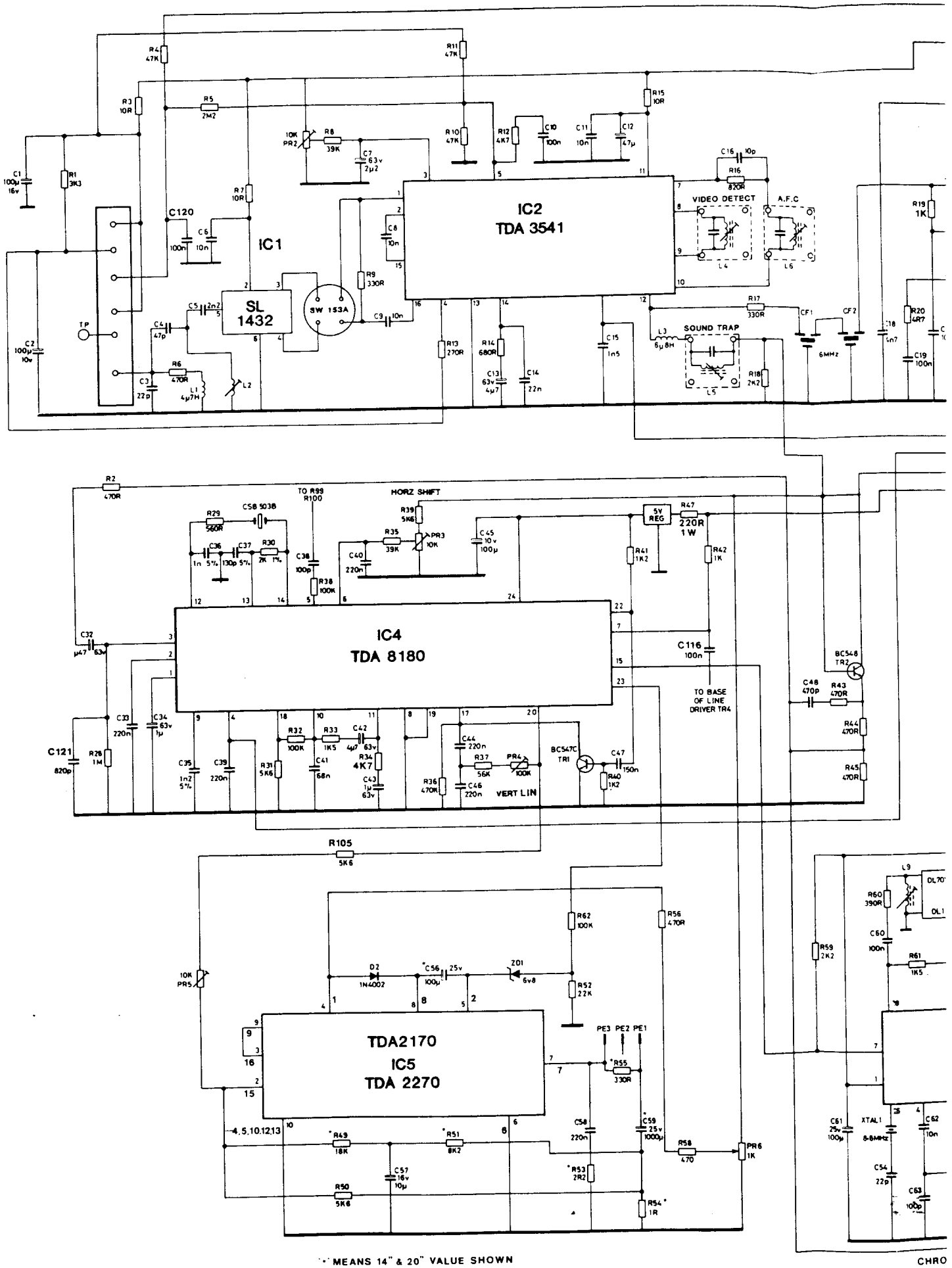
TRANSMITTER P.C.B. COMPONENT LAYOUT

Remote control commands of SAA5000A

No.	0 0	1 0
	Television mode	Teletext mode
1	Reset (on)	Reset (on)
2	Mute	Mute
3	Off	Standby
4	Pict.	TV/on
6	–	Hold
7	–	Reveal
8	Time	Text cancel
9	Volume +	Analogue 1+
10	Volume –	Analogue 1–
11	Bri +	Analogue 2+
12	Bri –	Analogue 2–
13	Con +	– (RA)
14	Con –	– (RA)
15	Col +	Timed page off (RA)
16	Col–	Timed page on (RA)
17	Station 1	Number 1
18	Station 2	Number 2
19	Station 3	Number 3
20	Station 4	Number 4
21	Station 5	Number 5
22	Station 6	Number 6
23	Station 7	Number 7
24	Station 8	Number 8
25	Station 9	Number 9
26	Station 10	Number 0
27	Station 3	Full page
28	Station 4 (VCR/on)	Top
29	–	Bottom
31	mix (mix)	Superimpose (mix)
32	Text	Teletext/on

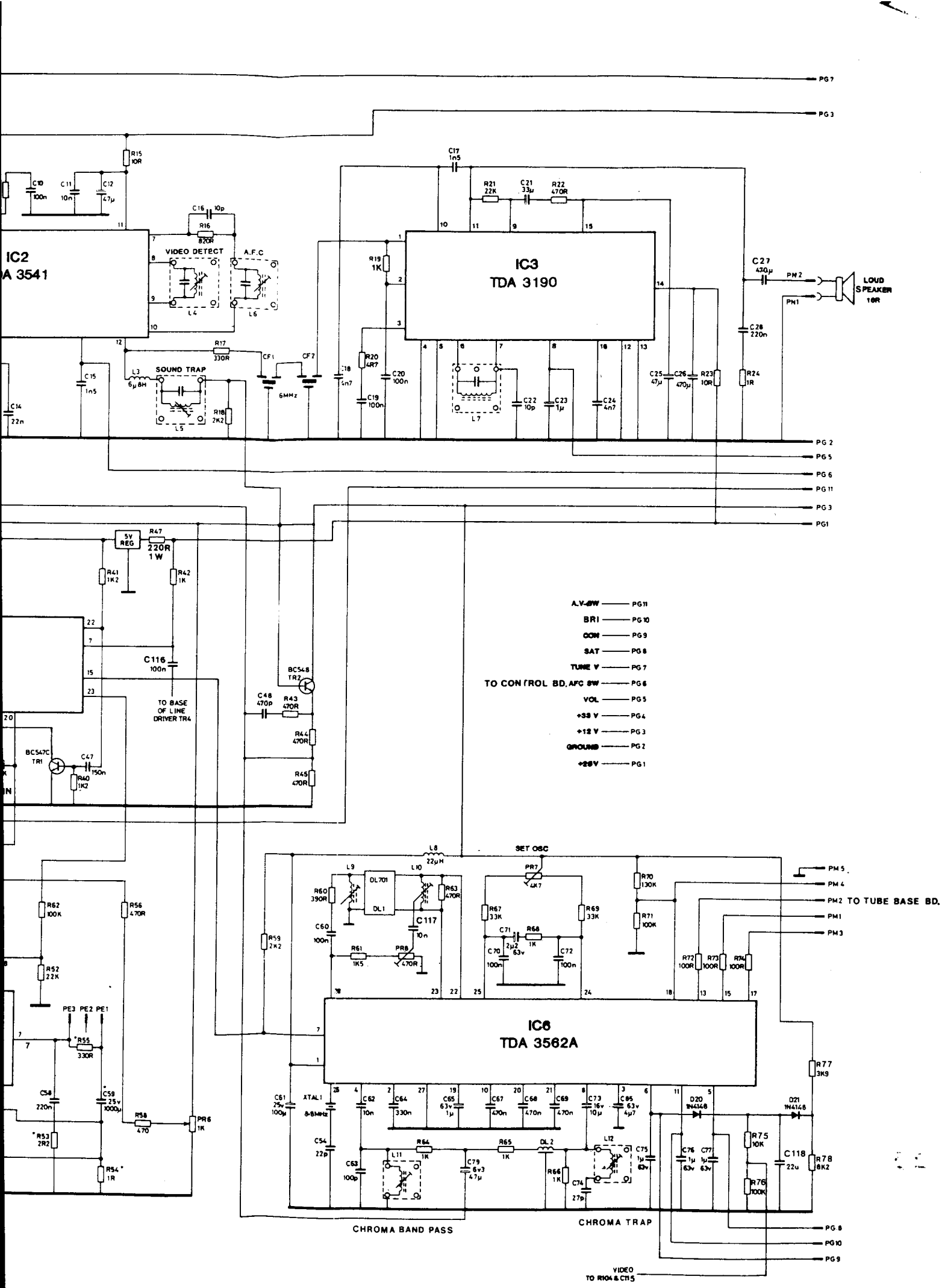


MODELS:– CTV 20R/CTV 2024/CTV 22R/CTV 2224
CONTROL P.C. BOARD CIRCUIT DIAGRAM

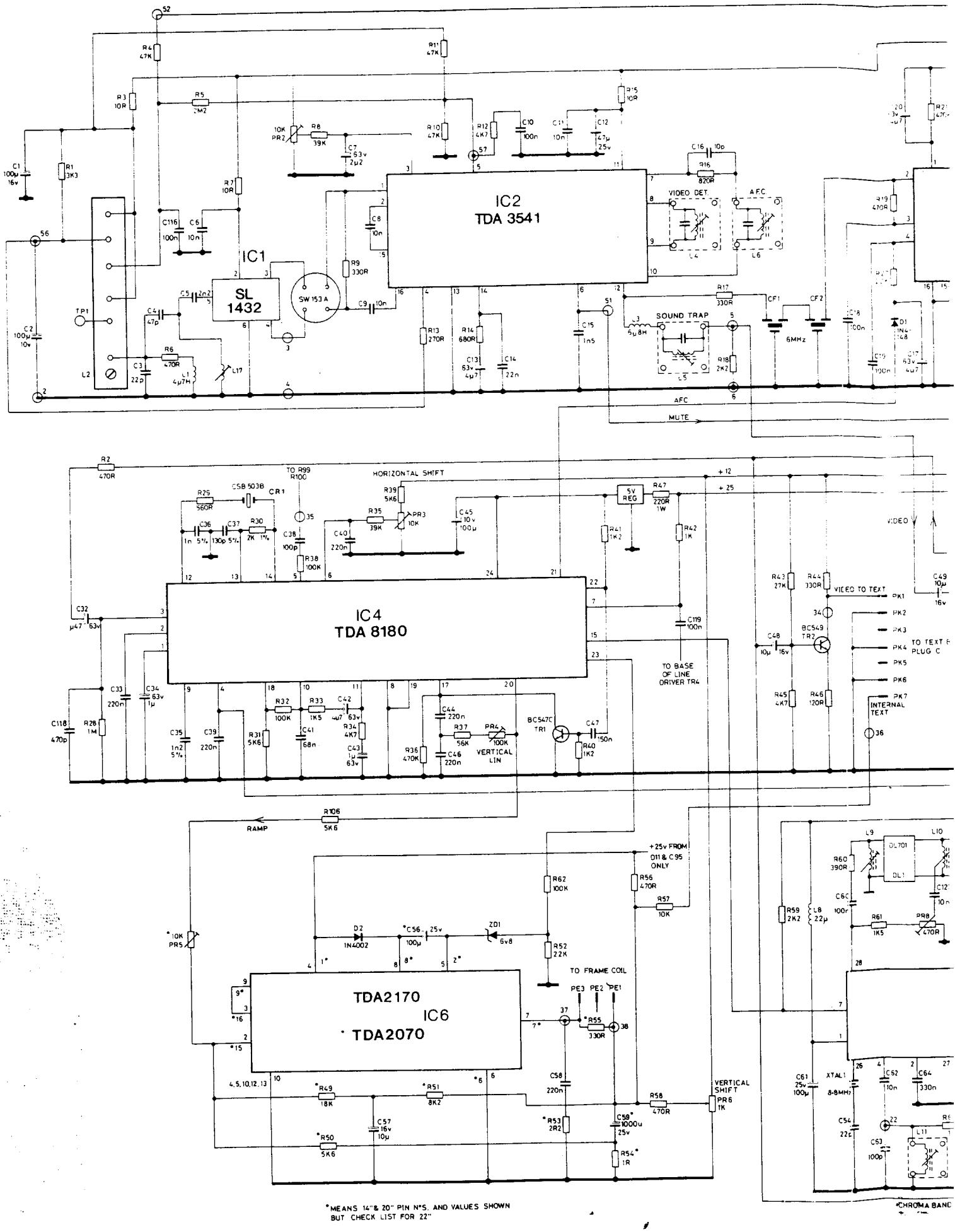


'*' MEANS 14" & 20" VALUE SHOWN
BUT CHECK LIST FOR 22"

MAIN P. C. BOARD – RF AND IF

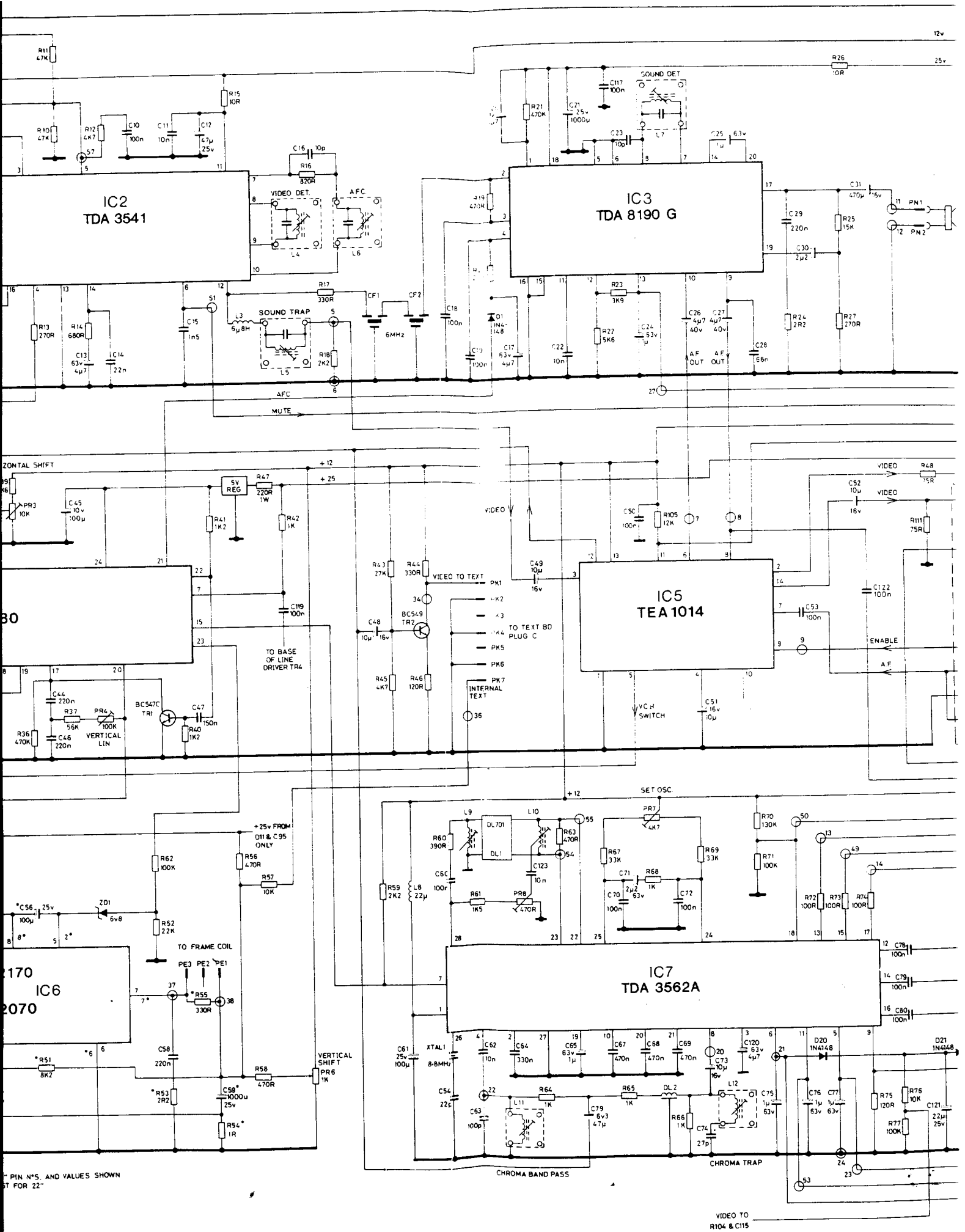


MAIN P. C. BOARD — RF AND IF CIRCUIT DIAGRAM

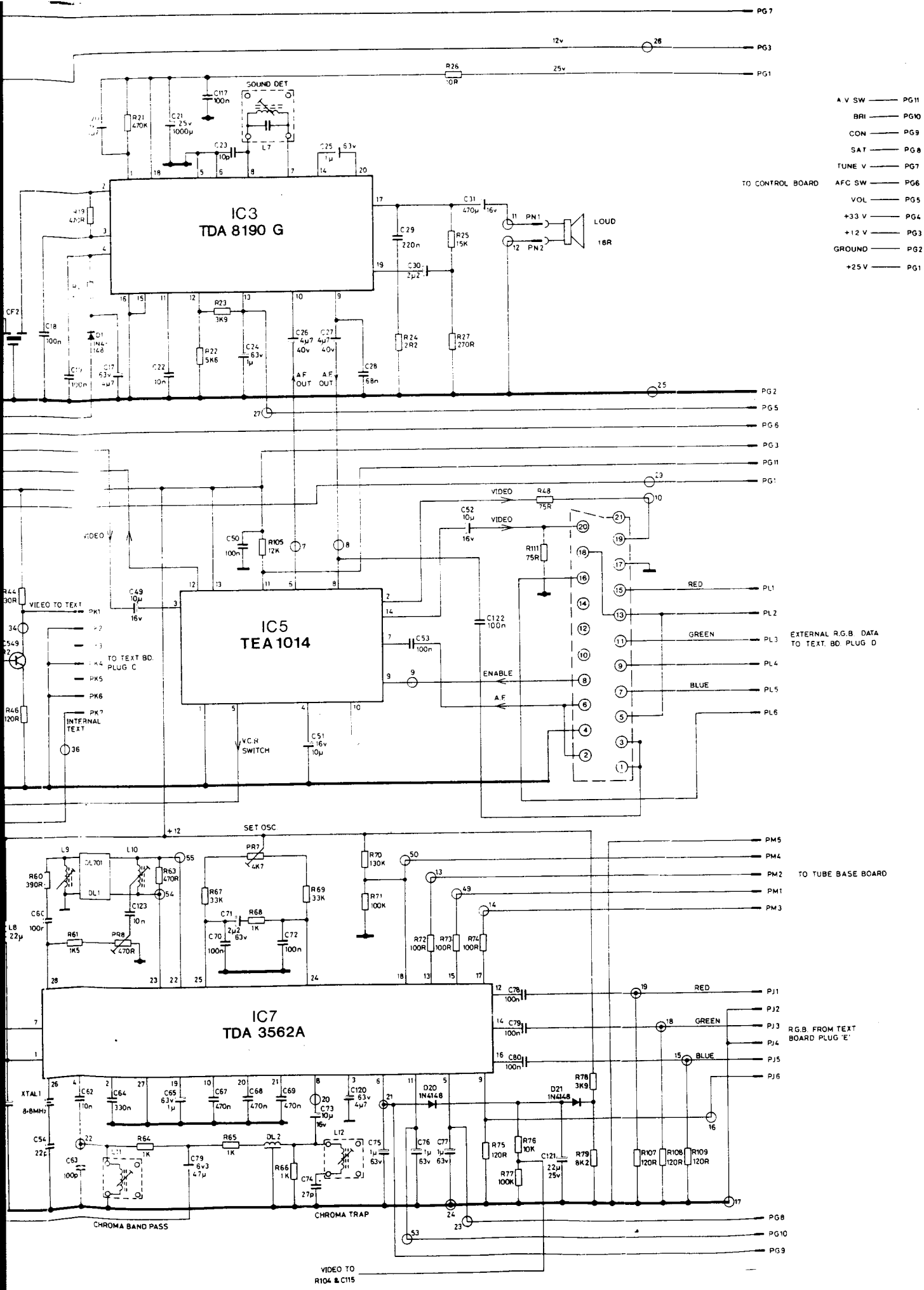


*MEANS 14" & 20" PIN N°S. AND VALUES SHOWN BUT CHECK LIST FOR 22"

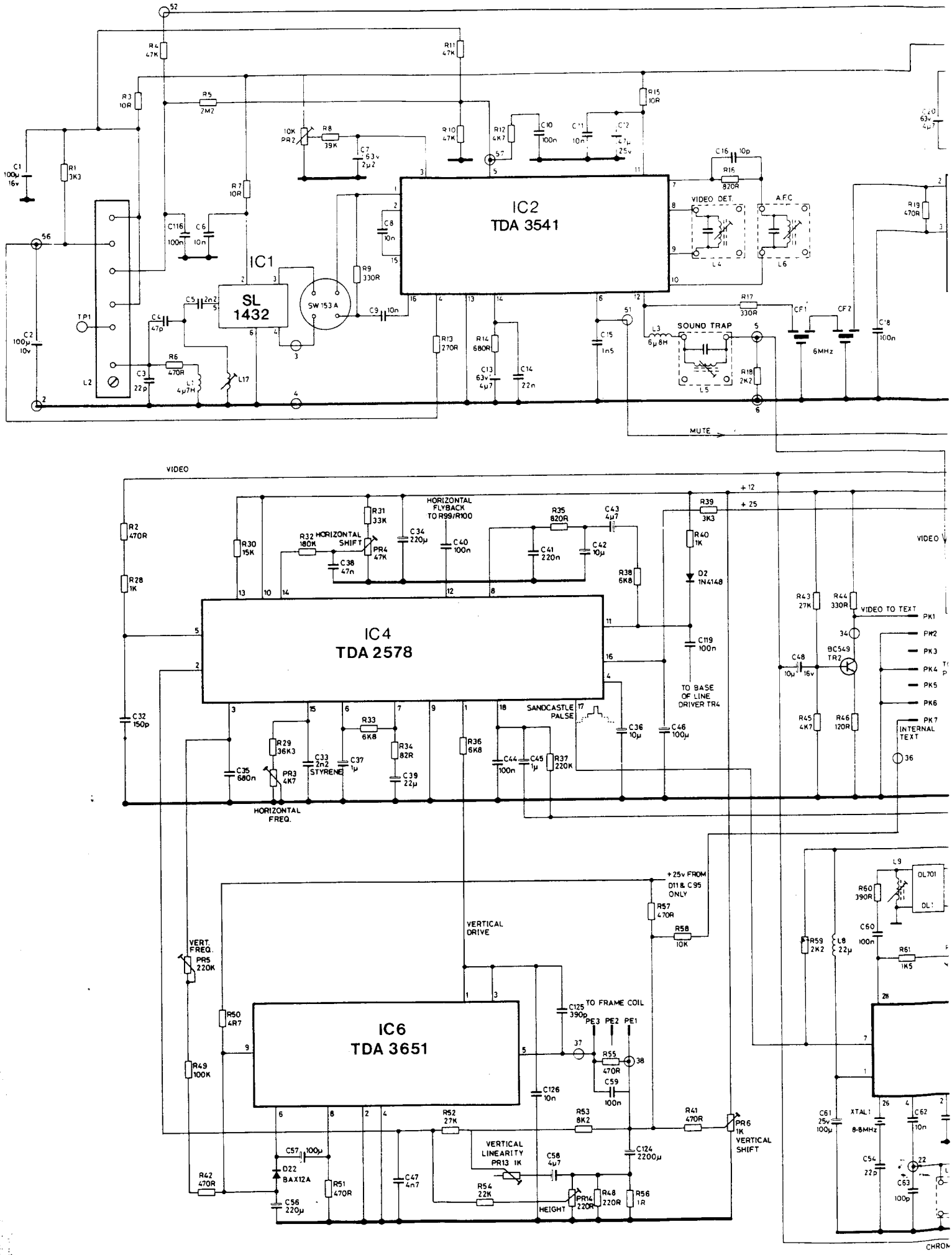
MAIN P. C. BOARD — RF AND IF CIRC



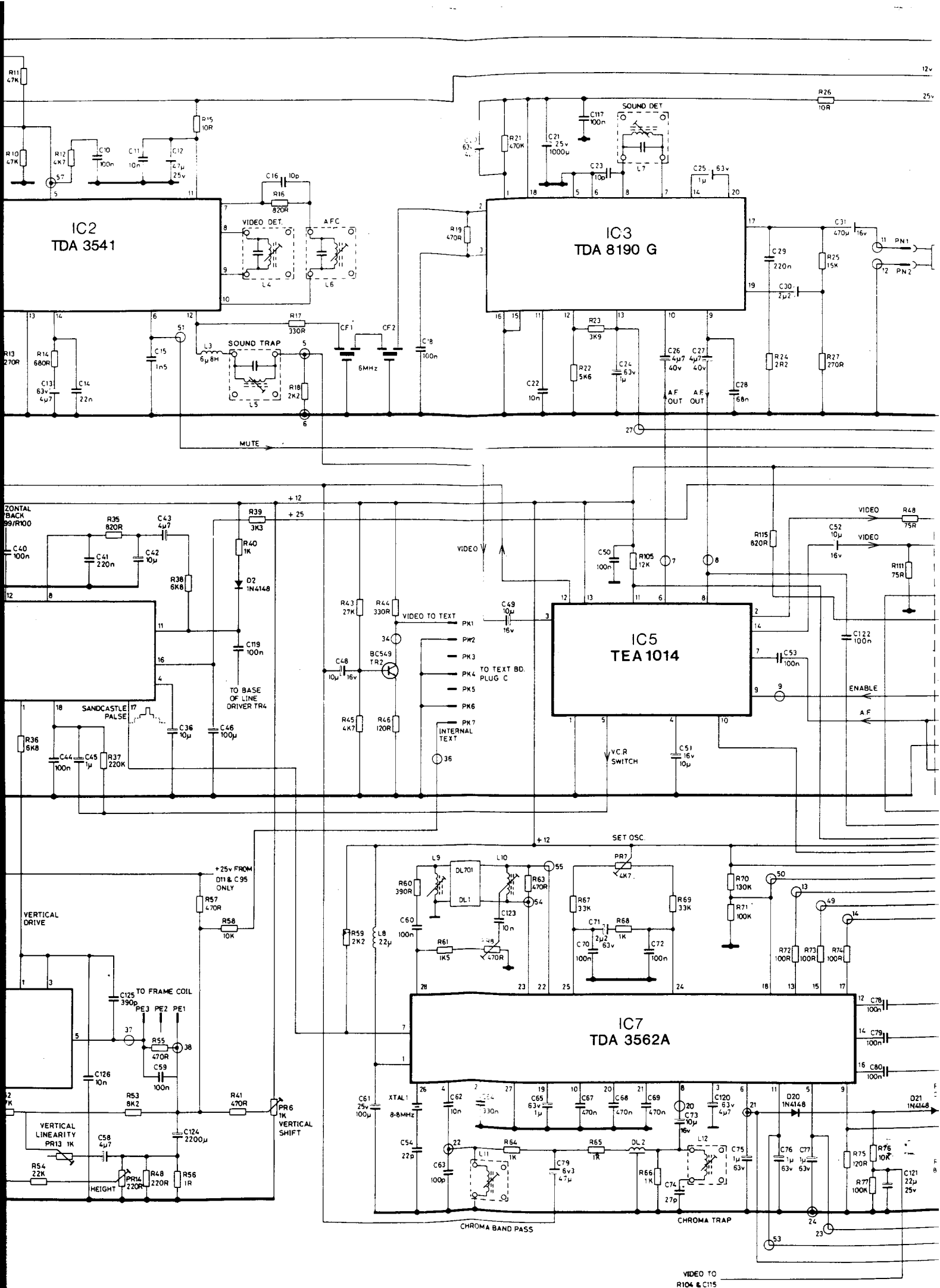
MAIN P. C. BOARD — RF AND IF CIRCUIT DIAGRAM



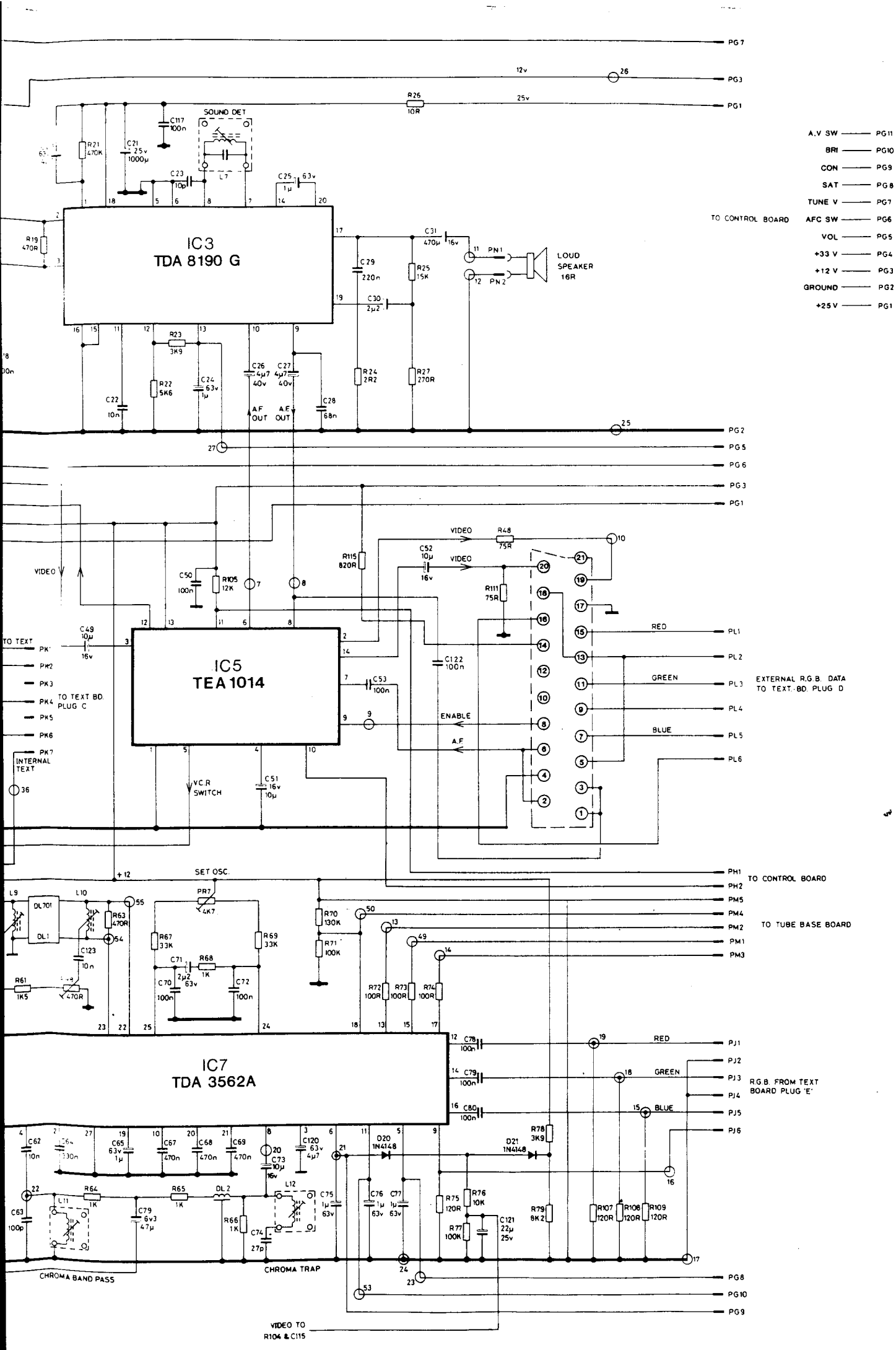
RF AND IF CIRCUIT DIAGRAM



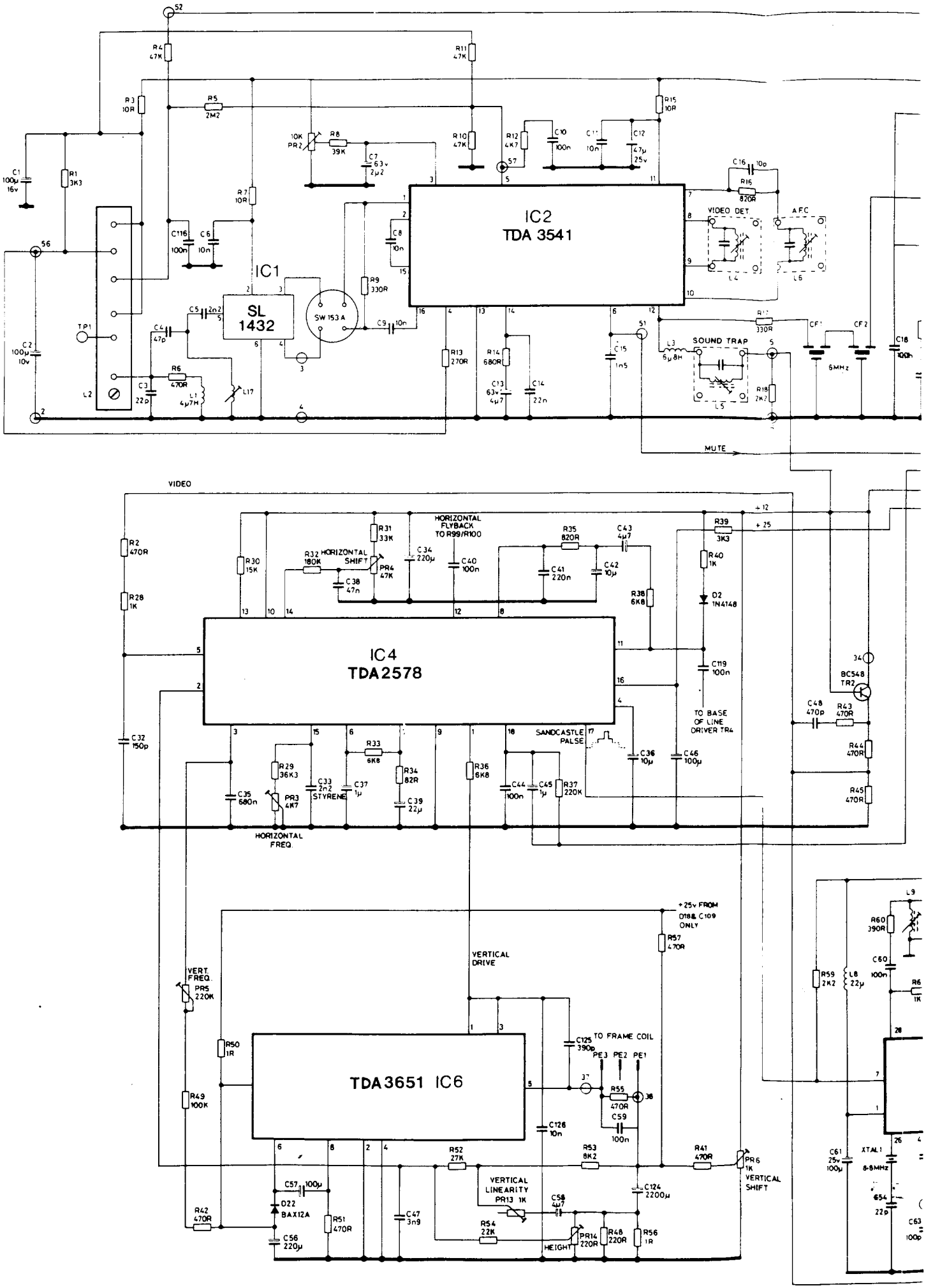
MAIN P.C. BOARD — RF AND IF C



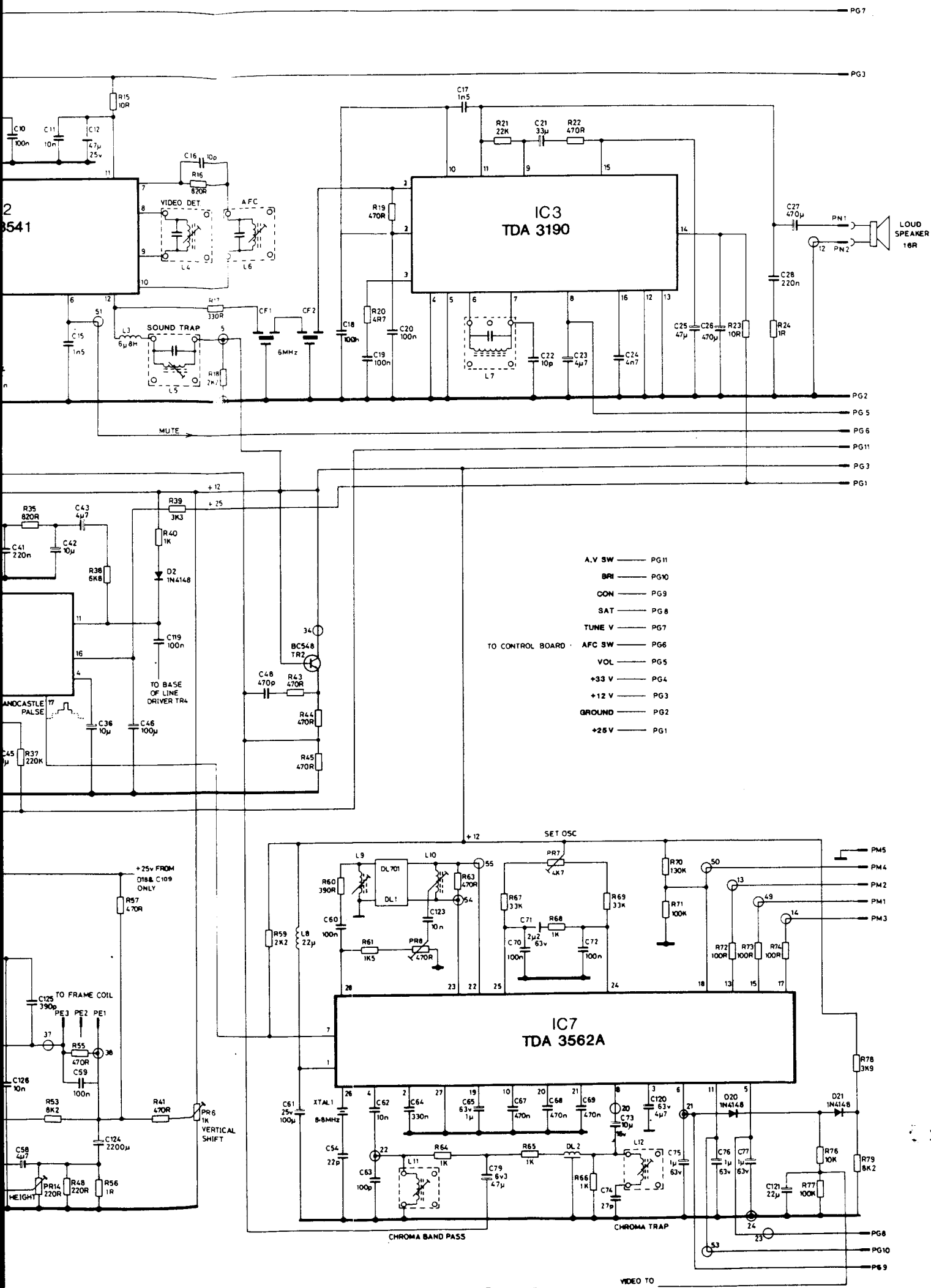
MAIN P.C. BOARD — RF AND IF CIRCUIT DIAGRAM



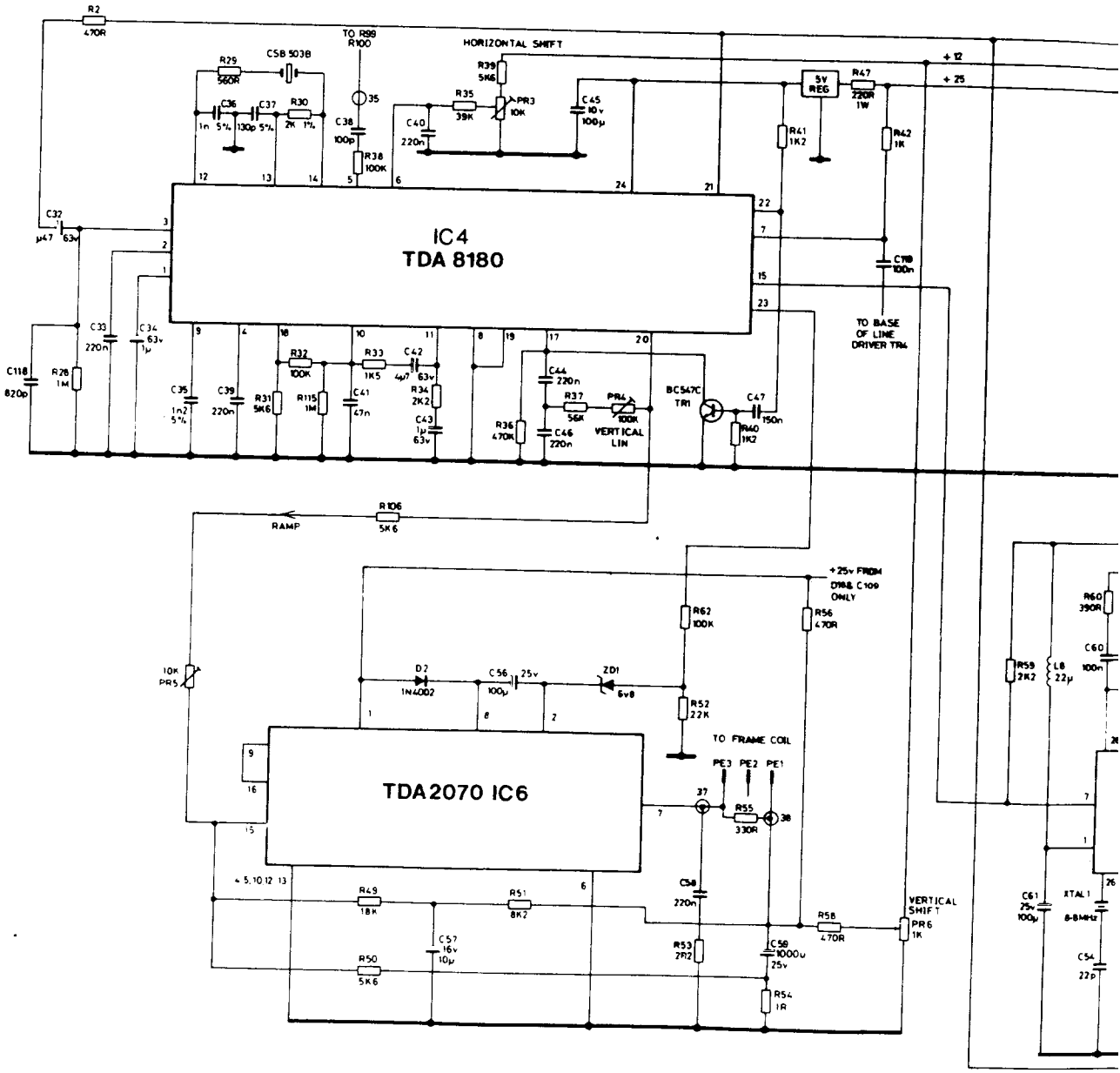
ND IF CIRCUIT DIAGRAM



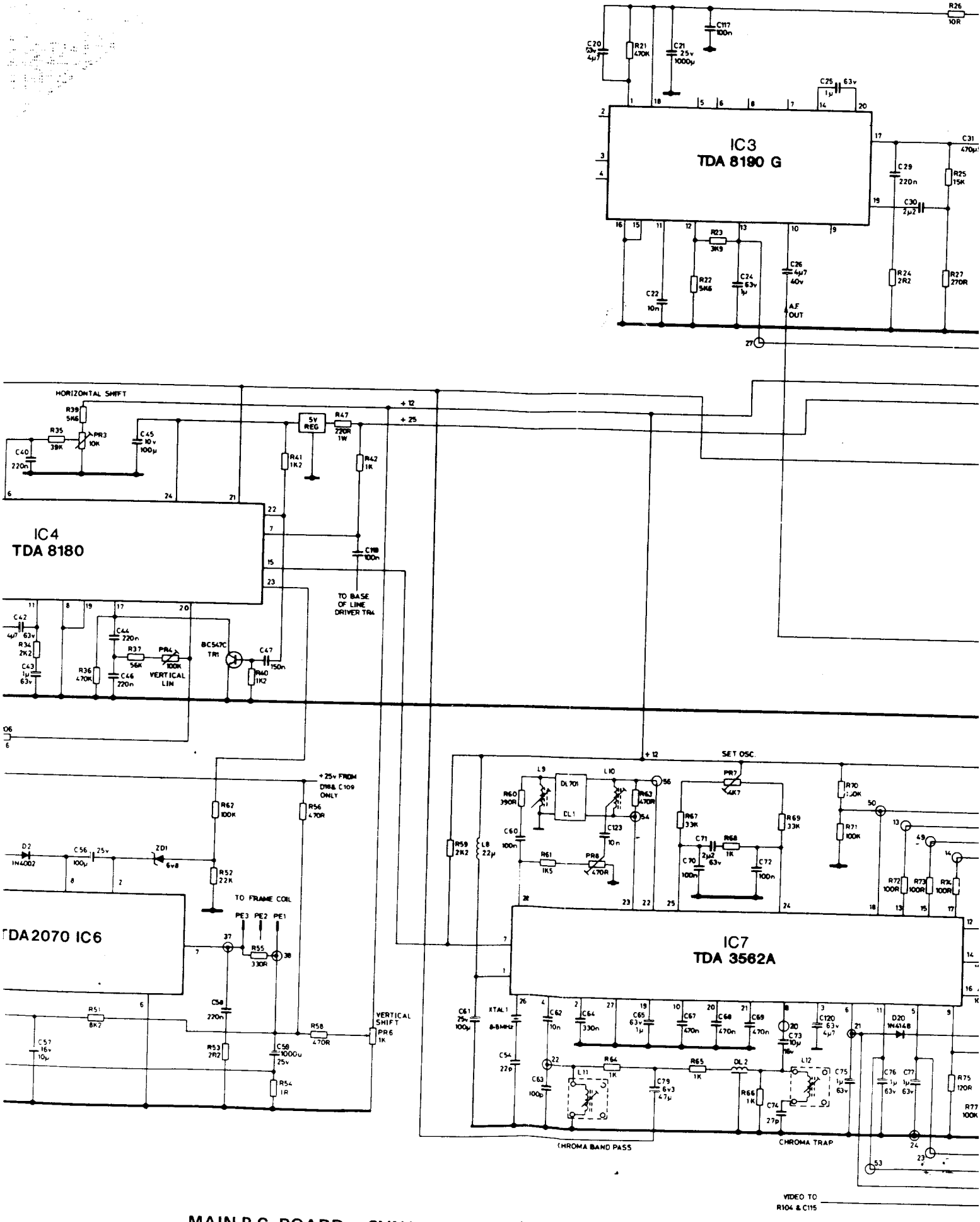
MAIN P.C.B. — RF AND IF



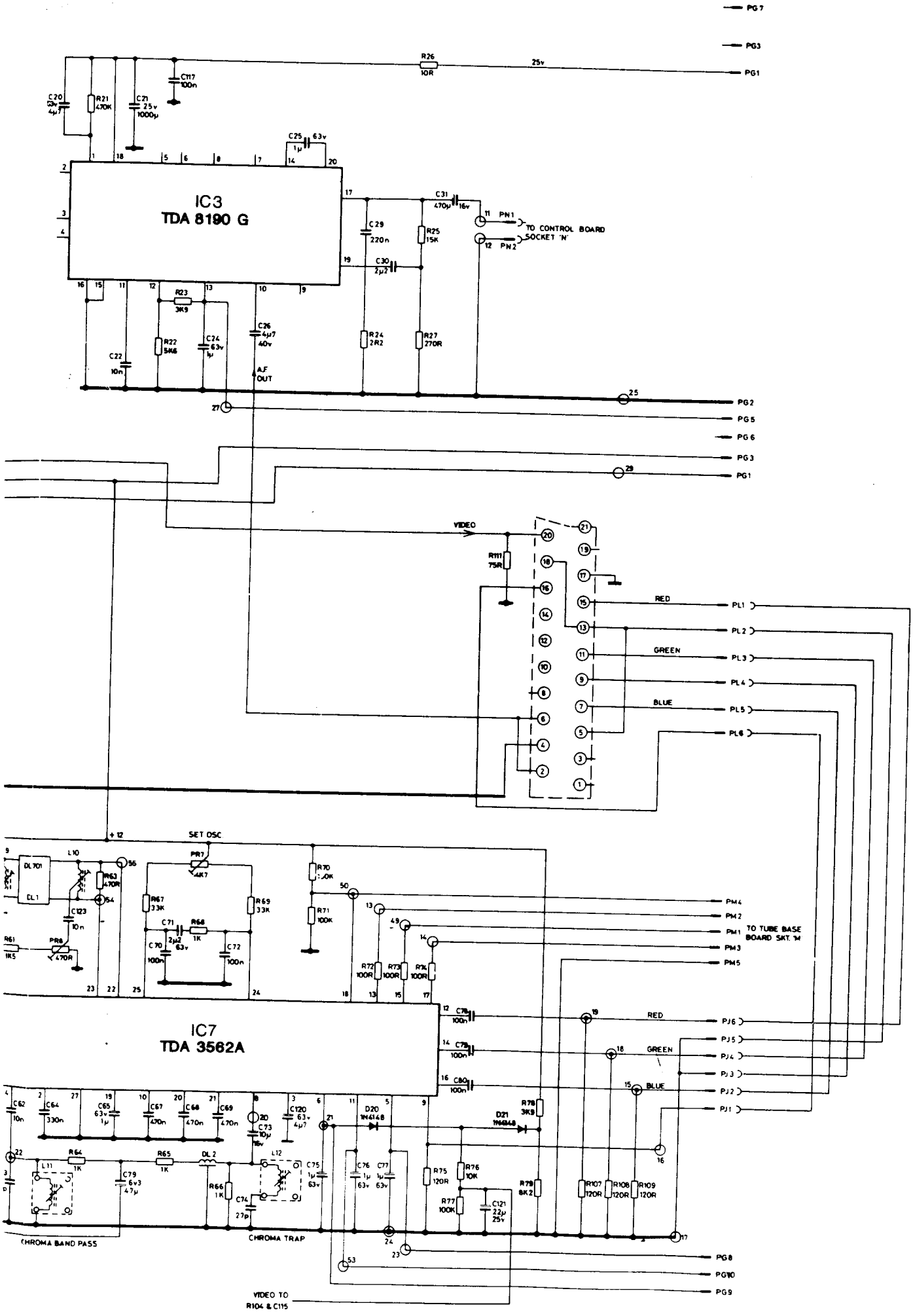
MAIN P.C.B. — RF AND IF CIRCUIT DIAGRAM



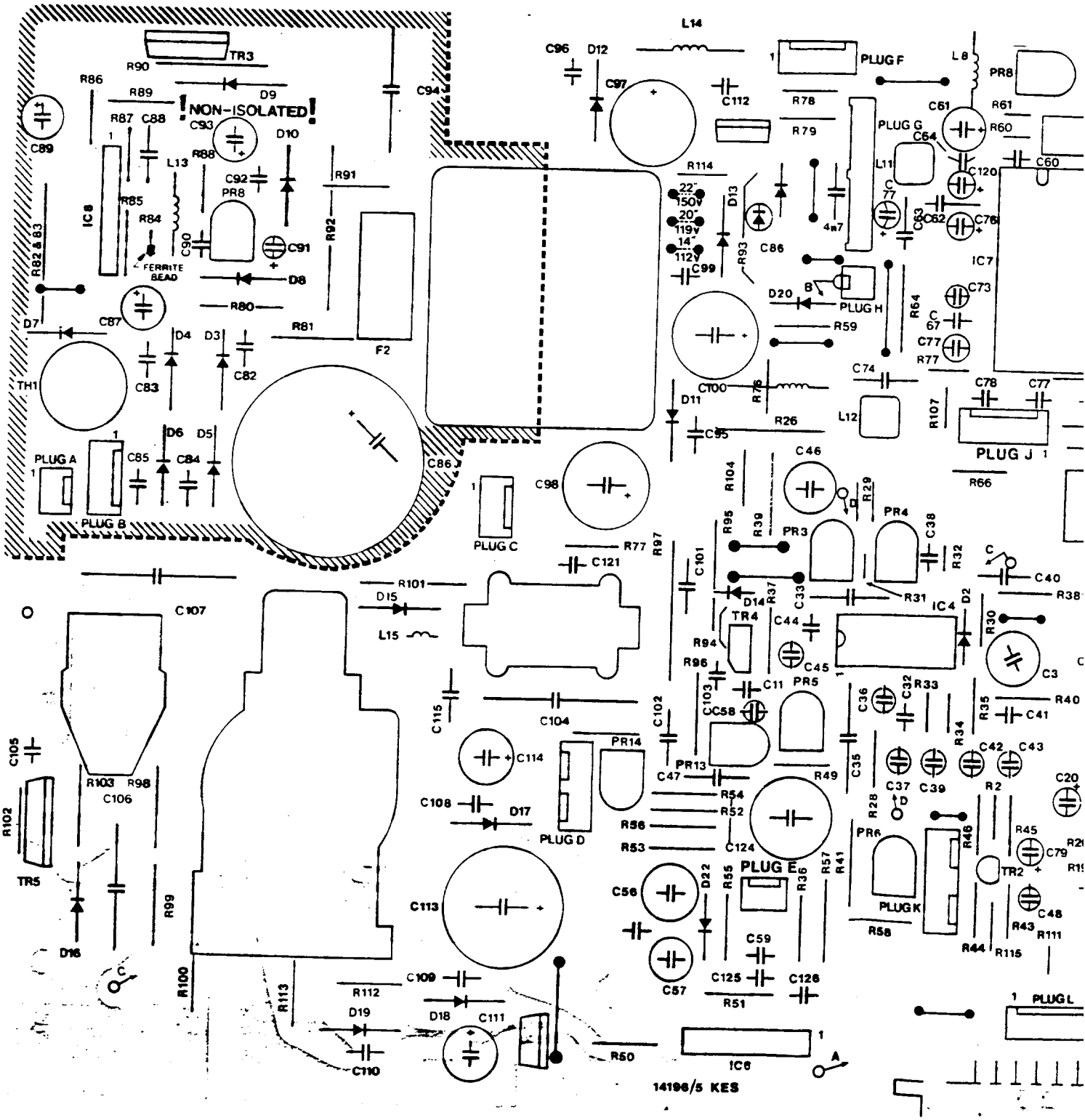
MAIN P.C. BOARD – SYNC PROCESSOR



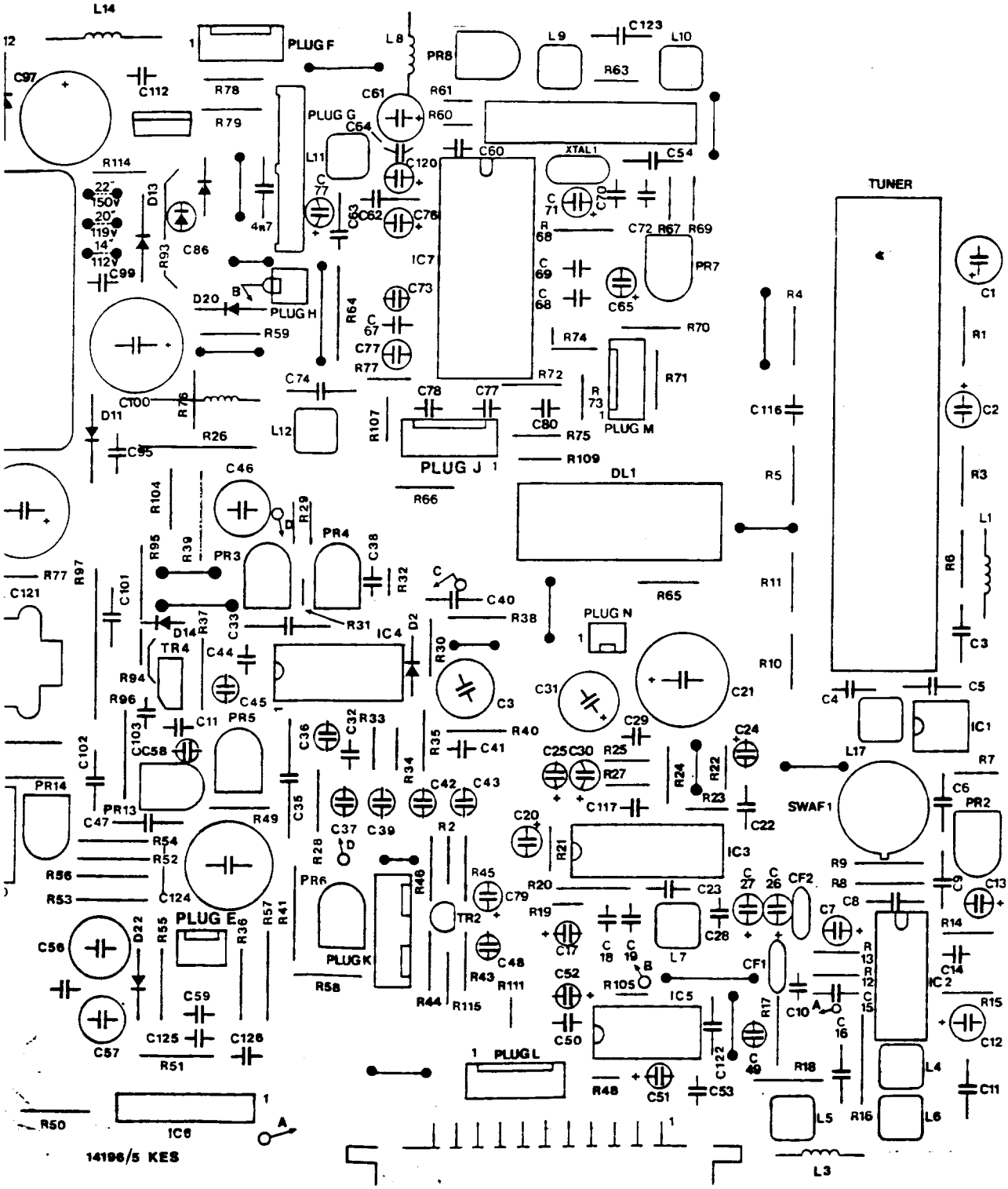
MAIN P.C. BOARD – SYNC PROCESSOR AND COLOUR DECODER CIRCUIT DIAGRAM



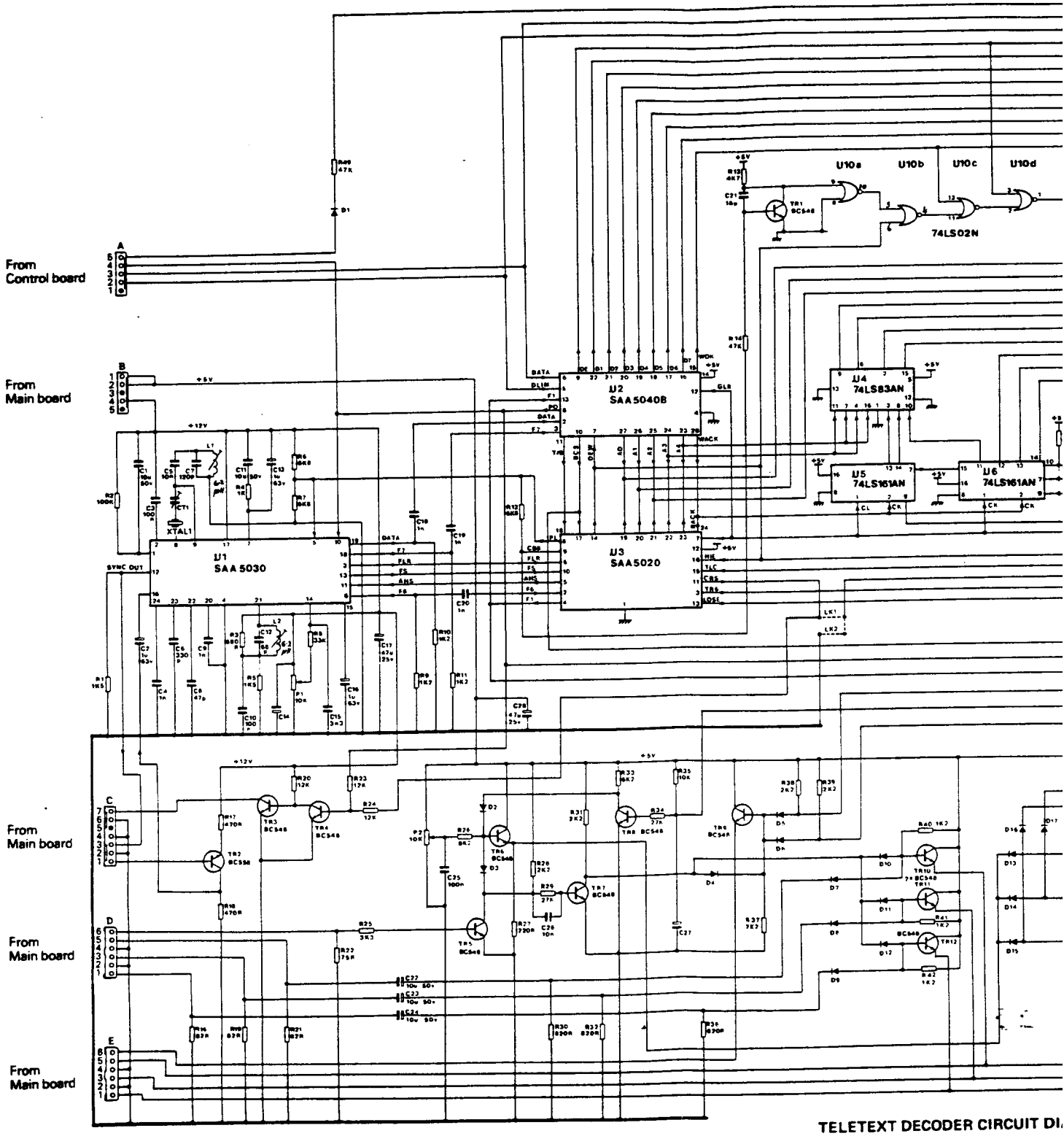
AND COLOUR DECODER CIRCUIT DIAGRAM



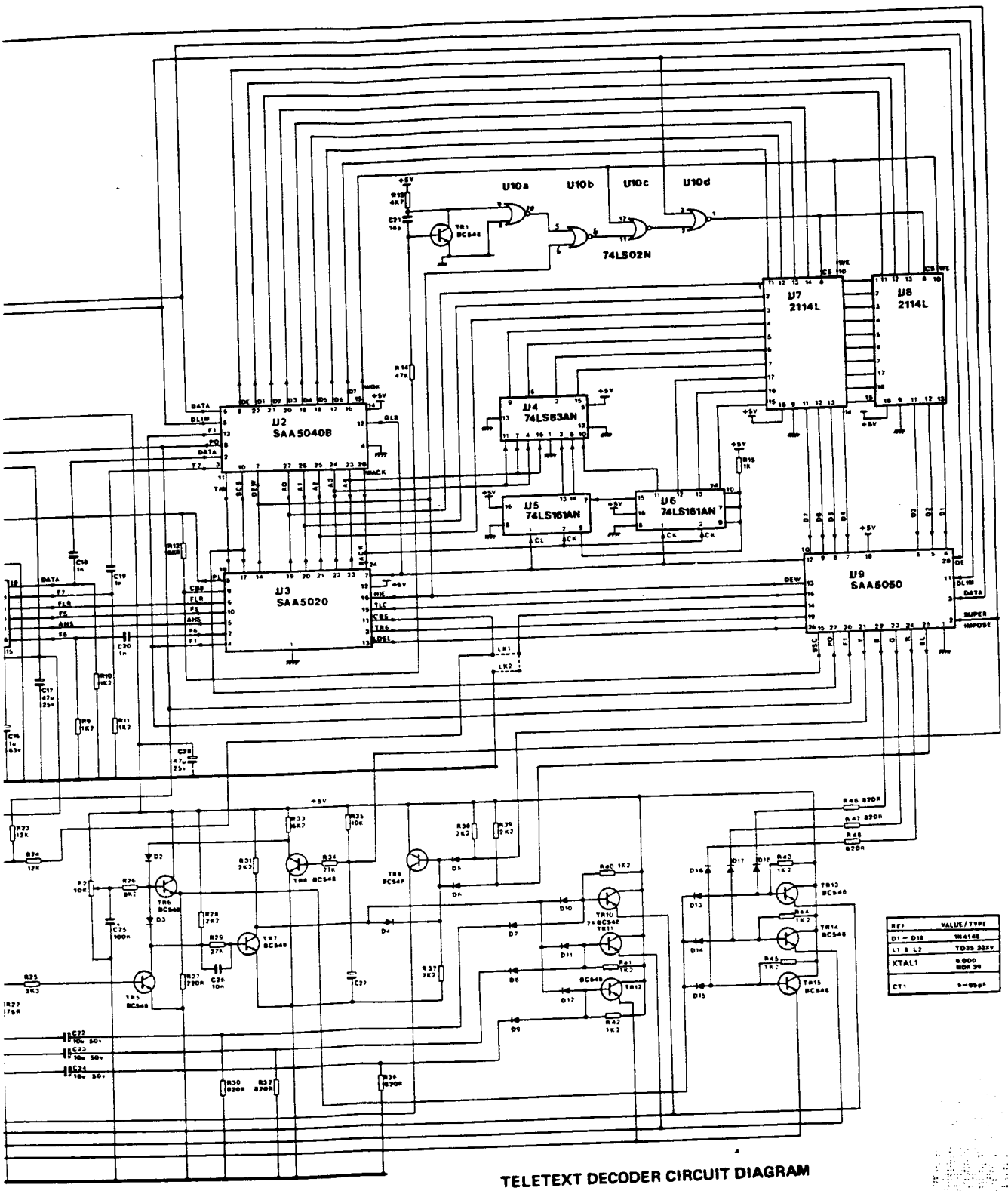
MAIN P.C. BOARD COMPONENT LAYOUT



MAIN P.C. BOARD COMPONENT LAYOUT

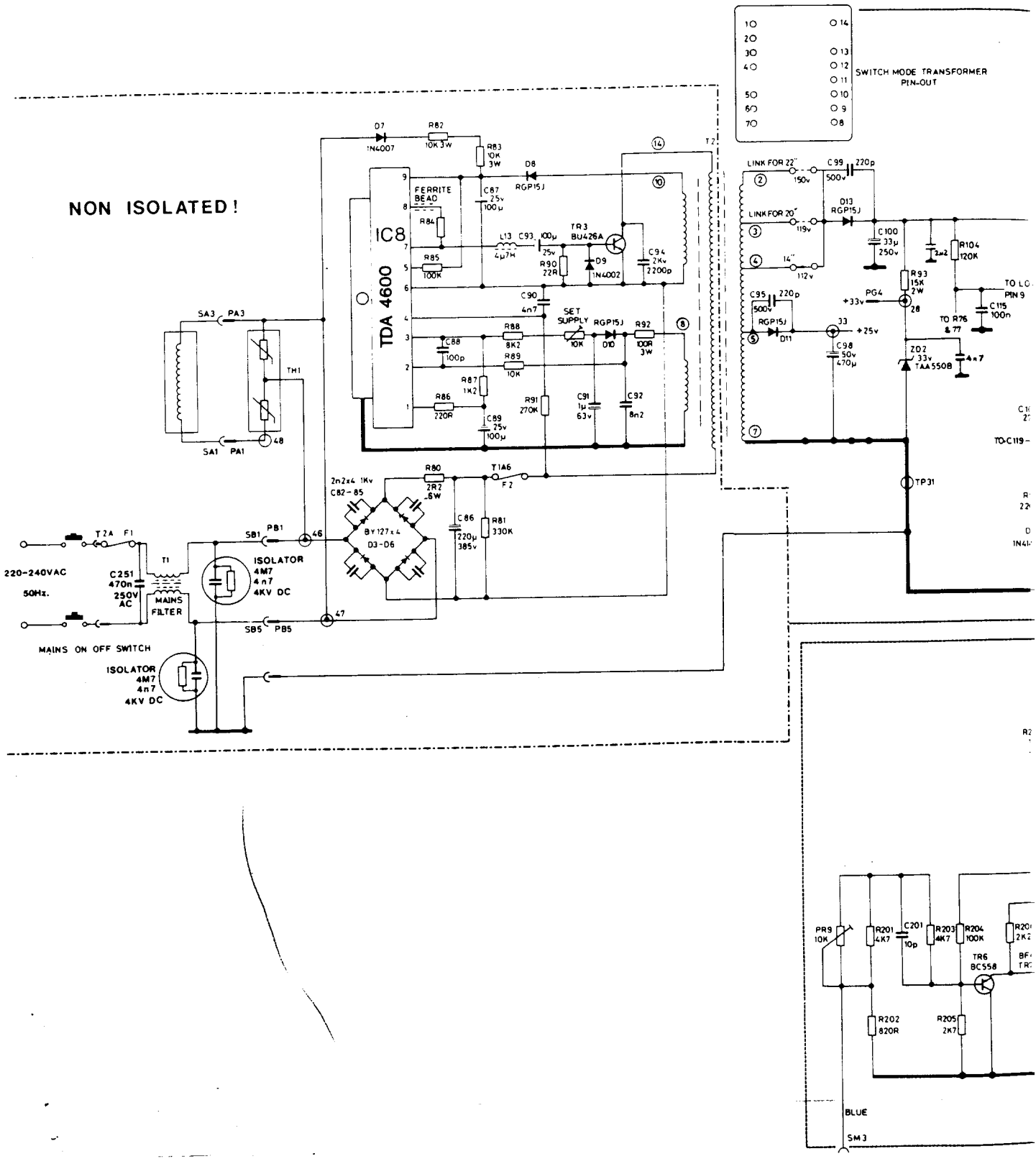


TELETEXT DECODER CIRCUIT DI

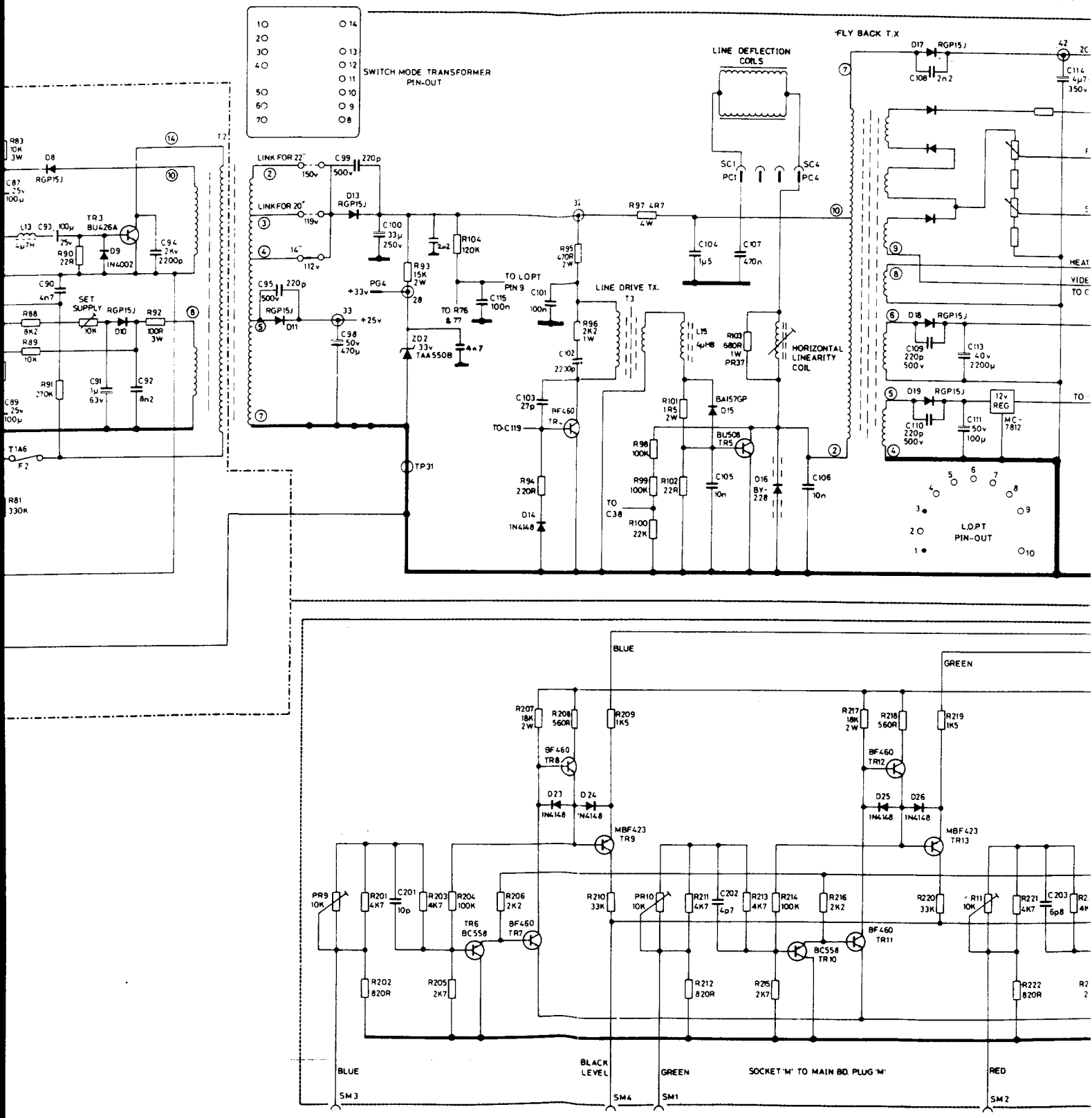


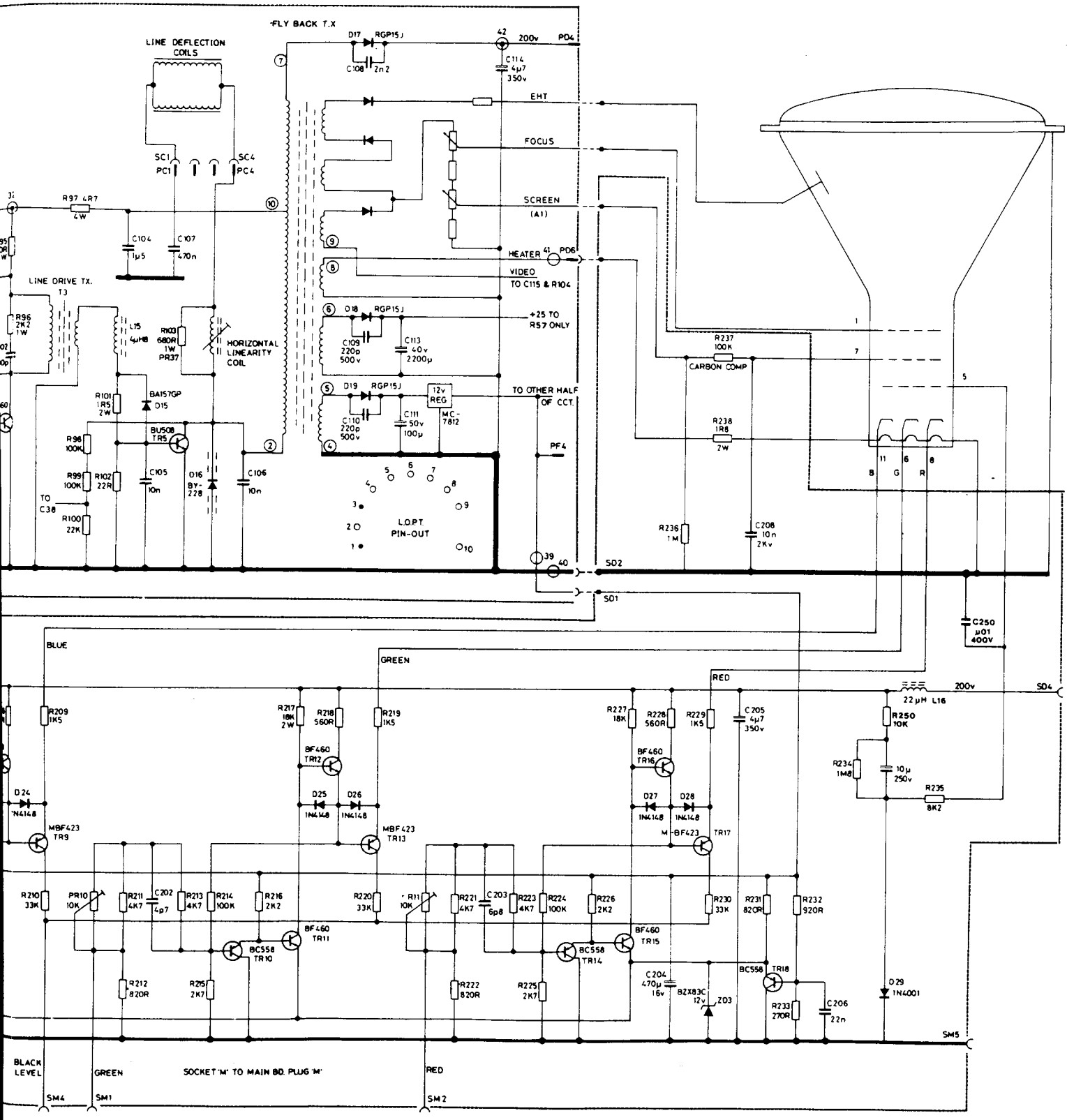
REF	VALUE / TYPE
D1 – D18	1N4148
L1 & L2	TOKO 3331
XTAL1	6.000 MHz
CT1	5–65pF

TELETEXT DECODER CIRCUIT DIAGRAM


NON ISOLATED!
SWITCH MODE TRANSFORMER PIN-OUT
TDA 4600
IC8
FERRITE BEAD
TR3 BU426A
D9 1N4002
D10 RGP15J
D11 RGP15J
D13 RGP15J
SET SUPPLY
ZD2 33v TAA5508
BY127x4 D3-D6
ISOLATOR 4M7 4n7 4KV DC
MAINS FILTER
220-240VAC 50Hz.
MAINS ON OFF SWITCH
LINK FOR 22" 150v
LINK FOR 20" 119v
14" 112v
TO C119
TO LO PIN 9
TO R76 & 77
TP31
BLUE
SM3
TR6 BC558

113


SWITCH MODE TRANSFORMER PIN-OUT
LINE DEFLECTION COILS
FLY BACK T.X
LINE DRIVE TX.
HORIZONTAL LINEARITY COIL
L.O.P.T PIN-OUT
SET SUPPLY
LINK FOR 22"
LINK FOR 20"
TO L.O.P.T PIN 9
TO C119
TO C38
TP31
TR3 BU426A
TR4 BF460
TR5 BU508
D8 RGP15J
D9 1N4002
D10 RGP15J
D11 RGP15J
D13 RGP15J
D14 1N4148
D15 BA157GP
D16 BY228
D17 RGP15J
D18 RGP15J
D19 RGP15J
ZD2 33v TAA5508
12v REG MC-7812
T1A6 F2
BLUE
GREEN
BLACK LEVEL
RED
SOCKET 'M' TO MAIN BD. PLUG 'M'
SM1
SM2
SM3
SM4
TR6 BC558
TR7 BF460
TR8 BF460
TR9 MBF423
TR10 BC558
TR11 BF460
TR12 BF460
TR13 MBF423


+FLY BACK T.X
LINE DEFLECTION COILS
SC1
PC1
SC4
PC4
R97 4R7 4W
C104 1µ5
C107 470n
LINE DRIVE TX. T3
R96 2K2 1W
L15 4µH8
R103 680R 1W PR37
HORIZONTAL LINEARITY COIL
R101 1R5 2W
BA157GP D15
BU508 TR5
R98 100K
R99 100K
R102 22R
C105 10n
D16 BY-228
C106 10n
TO C38
R100 22K
D17 RGP15J
C108 2n2
42 200v PD4
C114 4µ7 350v
EHT
FOCUS
SCREEN (A1)
HEATER 41 PD6
VIDEO TO C115 & R104
D18 RGP15J
C109 220p 500v
C113 40v 2200µ
+25 TO R57 ONLY
D19 RGP15J
C110 220p 500v
C111 50v 100µ
12v REG MC-7812
TO OTHER HALF OF CCT.
PF4
L.O.P.T. PIN-OUT
39 40 SD2
SD1
R237 100K CARBON COMP
R238 1R8 2W
R236 1M
C208 10n 2Kv
C250 µ01 400v
BLUE
GREEN
RED
200v SD4
22µH L16
R250 10K
R234 1M8
10µ 250v
R235 8K2
R209 1K5
R217 18K 2W
R218 560R
R219 1K5
R227 18K
R228 560R
R229 1K5
C205 4µ7 350v
D24 1N4148
D25 1N4148
D26 1N4148
D27 1N4148
D28 1N4148
BF460 TR12
BF460 TR16
MBF423 TR9
MBF423 TR13
MBF423 TR17
R210 33K
PR10 10K
R211 4K7
C202 4p7
R213 4K7
R214 100K
R216 2K2
R220 33K
R11 10K
R221 4K7
C203 6p8
R223 4K7
R224 100K
R226 2K2
R230 33K
R231 820R
R232 920R
BC558 TR10
BF460 TR11
BC558 TR14
BF460 TR15
BC558 TR18
R212 820R
R215 2K7
R222 820R
R225 2K7
C204 470µ 16v
BZX83C 12v ZD3
R233 270R
C206 22n
D29 1N4001
SM5
BLACK LEVEL
GREEN
SOCKET 'M' TO MAIN BD. PLUG 'M'
RED
SM4
SM1
SM2